NATUR CYMRU

The Nature of Wales

Number/ Rhif 23 • Summer/ Haf 2007

In this edition:

- Sticklebacks
- Pysgota cynaliadwy
- Bees
- Alien invaders
- Red squirrels
- Caddisflies

PLUS: Books, News, Comment...

NATUR CYMRU
The Nature of Wales

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Bwriedir i *Natur Cymru* hyrwyddo a chyfnewid gwybodaeth am fioamrywiaeth a hyrwyddo dadl. Os oes gennych wybodaeth, erthyglau neu waith celf y credwch a allai fod o ddiddordeb i'r darllenwyr, cysylltwch â'r Golygydd os gwelwch yn dda.

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Natur Cymru is intended to promote the exchange of information about biodiversity and encourage debate. If you have information, ideas for articles or artwork which you think might be of interest to readers, please contact the Editor.

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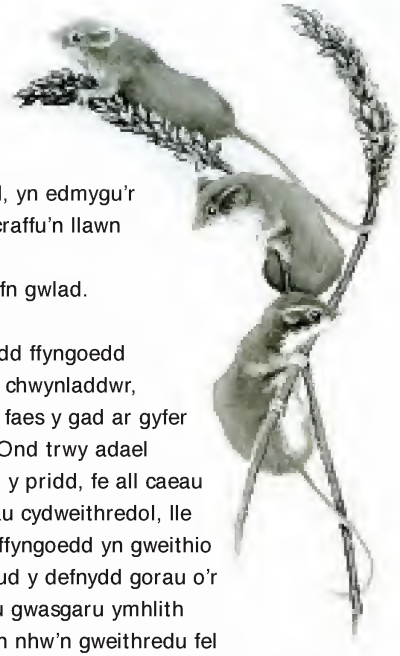
NATUR CYMRU GOLYGYDDOL



Yn sicr ddigon, mae ynysoedd adar Sir Benfro yn denu ymwelwyr o bell ac agos. Yn wir, mae diwydiant bach wedi datblygu yn sgil gallu'r adar, y morloi a'r llamidyddion i ddenu ymwelwyr. Mae natur, felly, yn creu swyddi, ac mae hyn yn rhywbeth sydd o blaid cadwraeth. Ond mae problem yn codi. Mae'r rheini ohonom sy'n hoffi mynd am dro i'r ynysoedd yma, yn enwedig pan fydd crwydryn prin yn picio draw, yn ymwybodol iawn o'r niwed amgylcheddol a all ddod yn sgil teithio. Yn ôl Andrew Lucas, fe ddylem osod esiampl, gan roi'r gorau i greu'r holl nwyon gwenwynig yma wrth ruthro'n llawn cyffro o un aderyn prin i'r llall.

Popeth mewn cymedroldeb – dyna mae pawb yn ei ddweud. Ond y raddfa sy'n bwysig. Marchnadoedd ffermwyr a physgota ar raddfa fach yn erbyn diwydiant pysgota mawr, prynwyr nwyddau byd-eang ac archfarchnadoedd barus. Felly, calonogol iawn yw darllen am bobl yn dod ynghyd i weithio er budd eu cymunedau a'r amgylchedd morol. Keith Jones sy'n adrodd hanes datblygiad pysgota cynaliadwy ym Mhen Llŷn.

Yn gynharach eleni, fe euthum i'r Ŵyl Tyddyn a Gardd er mwyn lansio ymgyrch i achub dolydd blodau gwyllt. Dyma sioe lai, a mwy anffurfiol na'r sioe fawr sydd ar ein gwarthaf. Fe fynychodd llawer y sioe hon gan eu bod wrth eu bodd efo cefn gwlad a da byw. Mae rhywun yn teimlo mwy o ddyletswydd i fynd i'r sioe fawr - rhaid i chi fod yno, yn pwyso a mesur yr anifeiliaid, yn edmygu'r peiriannau, neu'n craffu'n llawn diddordeb ar yr arddangosfeydd cefn gwlad.

Pan fyddwch yn lladd ffyngoedd glaswelltiroedd efo chwynladdwr, mae'r cae yn troi'n faes y gad ar gyfer gweiriau a chwyn. Ond trwy adael llonydd i ffyngoedd y pridd, fe all caeau droi'n gymdeithasau cydweithredol, lle bydd planhigion a ffyngoedd yn gweithio gyda'i gilydd i wneud y defnydd gorau o'r maetholion, gan eu gwasgaru ymhlith cystadleuwyr. Maen nhw'n gweithredu fel organeddau sengl. Hen ddolydd yn llawn o liwiau'r bengaled, pys-y-ceirw, a chribau San Ffraid ac ati, ac yn fwrlwm o furmur gwenyn. Mae'n werth dilyn esiampl Mike Hammett: eisteddwch mewn un llecyn am ugain munud, ac efallai y byddwch yn ddigon lwcus i weld gwenyn turio yn paru.

Cefais fy atgoffa gan rywun arall sy'n gwirioni ar ddolydd mai'r ddadl orau o blaid cadwraeth yw cael hwyl. Mae dôl yn yr haf, cyn iddi gael ei thorri, yn wefr pur i'r synhwyrau. Fe wn i am un ffermwr sydd wrth ei fodd efo'r gwesynnod y mae ei bwll dŵr yn eu denu, ac fe wn i am un arall sy'n cadw porfa wleb yn gymaint er budd y gwenoliaid a'r bywyd gwyllt arall ag ar gyfer y ferlen sy'n ei phori.

Mae'r pwysau diddiwedd ar ffermwyr i greu mwy o elw yn mynd yn groes i'r ffaith fod ffermio yng Nghymru, ers cyn cof, wedi golygu mwy na chynhyrchu incwm. Yn y byd sydd ohoni, gall ffermio fod yn waith blinderus, ond o leiaf fe allwch eistedd mewn llecyn tawel gan adael i fyd natur eich rhyfeddu: hynny yw, cyn belled â'ch bod wedi gadael digon o le i natur ar eich fferm. Mae rheolau di-rif yn gallu gwneud ffermio'n waith beichus, ond mae natur yn siŵr o roi'r sbonc yn ôl yn eich cerddediad.

James Robertson

Eucera longicornis

Michael Hammett

NATUR CYMRU EDITORIAL

Pembrokeshire's bird islands are a magnet for visitors. A small industry has developed around the pulling power of seabird cliffs, and regular seal and porpoise sightings. This example of nature delivering local jobs helps make the case for conservation, but there is a dilemma. Those of us who most enjoy visiting these islands, especially when a rare vagrant drops by, are also likely to be well aware of the environmental cost of too much travel. Andrew Lucas argues that we should start taking a lead, and stop belching out noxious gases as we rush from one exciting rare bird to another.

Everything in moderation, people used to say; it's all a matter of scale – farmers' markets and small-time fishing as against industrial fishing, global commodity buyers and greedy supermarkets. So it is encouraging to read about people getting together to do the right thing for their communities and the marine environment. Keith Jones reports on moves towards sustainable fishing on the tip of the Llŷn peninsula.

I attended the Royal Welsh Festival, which used to be called the Smallholders Show, earlier this year, to launch a campaign to save traditional wild flower meadows. The show is a scaled-down, more easy-going version of the summer one which is now upon us. People were there because they love countryside life and livestock. There is rather more competitiveness and duty about attending the big show – you have to be there, to look knowingly at the stock, prosperously at the machinery, or earnestly at the countryside exhibits.

When you kill grassland fungi with fertilizers, fields become a battleground of planted grasses and weeds. But keep their soil fungi intact, and they transform into cooperative societies, where plants and fungi work together to make the best use of limited nutrients, and spread them amongst competitors. They act like single organisms. Old meadows awash with colour from knapweed, bird's-foot trefoil, betony and so on, also hum with bees. It is worth following Mike Hammett's example: sit in one spot for twenty minutes, and you may be the first observer of some mining bees' mating routine.

Someone equally passionate about wild flower meadows reminded me that the best argument for conservation is that it is fun. A hay meadow in high summer, before it is cut, is a joy to the senses. I know a farmer who delights in the dragonflies his ponds attract, and one who keeps a wet pasture as much for the swallows and other wildlife he watches there as for the pony that grazes it. Both will keep these features for the pleasure they get out of them.

The relentless pressure on farmers to improve the profitability of their businesses runs counter to the fact that farming in Wales has always been about more than income. Farming can be stressful these days, but at least you can sit somewhere quietly and let wildlife surprise you: that is, as long as you have left room for nature on the farm. Rules and regulations may take the fun out of farming, but nature puts it back.

James Robertson

Patrick Robertson

Sticklebacks

a story of hard labour, sex and cannibalism

Ten-spined stickleback *Pungitius pungitius*

Sometimes the 'small fry' of the wildlife scene pack a surprising punch: it would be easy to dismiss the humble stickleback as of little interest, but that would be to miss out on the dramatic lives of these bright little fish, as TRISTAN HATTON-ELLIS and ZIGGY OTTO reveal.

Childhood memories for many of us who were brought up in the country include visits to the nearest pond or stream on warm summer days, either to build a dam, tickle a trout or just to sit still and watch: there were greater water boatmen backstroking across the water surface or the occasional dragonfly hovering above the water before speeding off at warp 6, but the heart really started thumping when we realised there were fish in the water, most commonly brown trout, minnow or stickleback.

This article pays homage to one of the most glamorous and sexy families of fish found in Welsh waters – the sticklebacks. Charles Dickens referred to sticklebacks obliquely in *The Pickwick*

Papers – Mr Pickwick published a paper on "the natural history of tittlebats", a childish name for sticklebacks then more widely known.

Sticklebacks are adapted to live in the widest possible range of aquatic environments. They prefer shallow waters choked with aquatic vegetation in summer, such as freshwater streams and ponds, ditches, estuaries, rock pools and saline lagoons, and coastal waters. They can even be found where there is less than 10cm of water and where oxygen levels are too low for most other fish to survive.

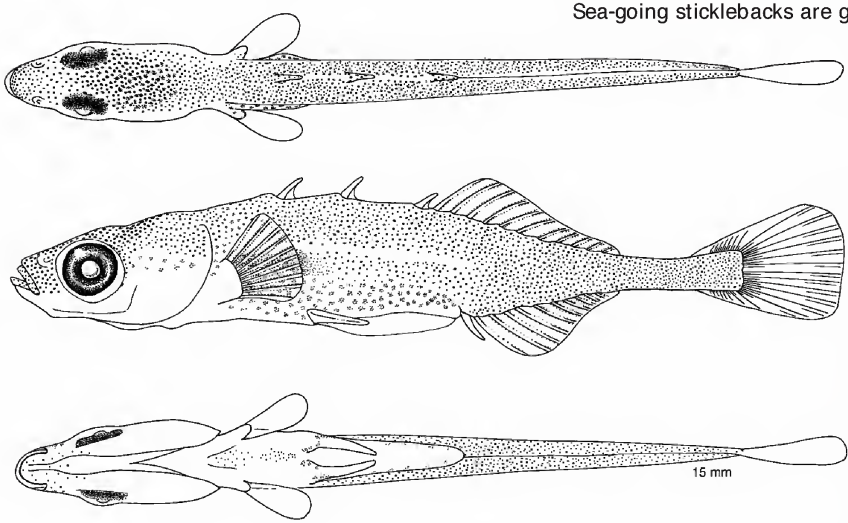
The fish are easily distinguished by the absence of scales and the presence of distinct spines on their backs. The family name *Gasterosteidae* means 'bony stomach', and includes 16 species widely distributed in the northern hemisphere. They are a curious and rather specialised family. The oldest known stickleback fossil dates from the Miocene period, between 23 and 5 million years ago. They are distantly related to seahorses, with a stiff, bony body that restricts rapid swimming, and an elongated mouth enabling them to pick small invertebrate prey from vegetation. Sticklebacks swim in a characteristic manner, mainly using their large paddle-shaped pectoral fins, which give them excellent manoeuvrability in the densely vegetated habitats they favour.

Three native sticklebacks

Three species of stickleback are native to Wales, all named after the approximate number of dorsal spines. The ten-spined stickleback *Pungitius pungitius* is the smallest of all our freshwater fish, with a maximum length of about 7cm. It can be found in fresh, brackish or saline waters. The fifteen-spined stickleback or sea stickleback *Spinachia spinachia* can grow up to 25cm in length, and is a marine species, though also extending into brackish water.

The most common stickleback species found in Welsh waters, however, is the three-spined stickleback *Gasterosteus aculeatus*. It is a small torpedo-shaped fish with a slender tail and broad fan-like tail fin, usually 5-7cm long, and rarely reaching 10cm in length. Two to four, but usually three, sharp spines are borne on its back in front of the dorsal fin. The first two spines are long and strong while the third is small. The pelvic fin is reduced to a single fin-ray and one sharp spine. The dorsal fin is longer than the anal fin. The sides bear a few bony plates, the number of plates increasing with increasing salinity, depending on the habitat they live in.

Colouration of three-spined sticklebacks is variable: olive-green to blue-black on the back, silvery with dark blackish specklings on the sides and whitish (often with a blue, yellow or olive hue) on the belly. Sea-going sticklebacks are generally more silvery than those that remain in freshwater all year round.



Daniel Faber

Sticklebacks are nocturnal predators, but need quite a lot of light to be able to detect the movement of their prey. They probably hunt more successfully on a moonlit night. They devour a wide range of aquatic invertebrates, including planktonic

CCW

Male three-spined stickleback in mating colours

crustaceans, midge larvae, water hog-lice, water fleas such as *Daphnia*, as well as small snails and worms, and even fish eggs, young fish and tadpoles. In turn, sticklebacks are taken by a wide range of predators, and are therefore a most important keystone species in many aquatic ecosystems. Bird predators include heron and kingfisher, and sticklebacks that stray outside the very weedy shallows are also likely to be eaten by perch. Understandably, all predators take care to ensure that the stickleback is swallowed head-first so that it slides into the stomach easily. If swallowed tail-first, the spines would catch in the predator's oesophagus, with painful consequences.

A very unusual courtship

The reproductive behaviour of the stickleback is probably the most riveting aspect of its life, and as it copes well with captivity, it is one of the most studied laboratory animals. The three-spined stickleback breeds in spring and early summer, when water temperatures have reached 12°C, and hormonal changes prime both sexes for reproductive action. In the process, the males attain a brilliant mating dress, with bright red throat and belly and blue eyes, both to attract females and to ward off other males.

The male builds a hollow nest from seaweeds and aquatic plants, about 5cm in diameter, which is glued together using secretions from his kidney. He then guards his nest and surrounding territory from other males. A ripe female is attracted to the nest by the male's intricate and elaborate 'zig-zag' courtship dance, at the end of which she follows him into the nest. Females who do not respond to the male advances are chased and bitten. Once the female enters, the male nuzzles her belly, thus stimulating her to release her yellow eggs. Then the male sheds sperm over them and guards the nest from hatching onwards. Very few fish indeed exhibit parental care in this way - most other fish show no parental care at all once the eggs have been laid. Baby sticklebacks grow quickly and breed the year after hatching; many then die at this stage, but the survivors can have a life-span of about three years. Outside the breeding season, sticklebacks may be found in loose shoals.

The life of a stickleback male is hence far from easy. It is filled with hard labour, high-maintenance females and encounters with cannibalistic females and dominant alpha-males, the latter frequently culminating in pseudo-homosexual behaviour. Yes, we didn't realise as kids, when we were enthralled by the sheer beauty of these red-bellied fish and were trying to trap them in our jam-jars, that there is a complex and extraordinary story behind the fascinating behaviour of our native sticklebacks.

As far back as the early 1950s, researchers reported pseudo-homosexual behaviour in the ten-spined stickleback. In experimental conditions in fish tanks, not all the males could establish territories and build nests for reasons of available space. However these nest-less males were highly motivated sexually, although frustrated and unable to express themselves in the presence of the dominant males. Homosexual behaviour was displayed in the interaction of the restless males with the nest-owning males. When females were removed from the tank, nest-owners would perform the courtship dance to other males.

Courtesy Dr Daniel Pauly & www.fishbase.org

Under certain circumstances, nest-less males were observed to mimic courted female behaviour, entering the nest as if to lay eggs, even pushing females aside to do so. It has been suggested that this behaviour pattern is an outlet which relieves sexual frustration, but it can also lead to the fertilisation of the eggs by the second male 'cuckoo' stickleback.

A secure future?

None of the three sticklebacks present in Britain are considered threatened, but little information is available on the distribution of either the ten-spined or the fifteen-spined species. Both of these seem to have rather specialised habitat requirements, and further examination of their distribution, habitat needs and conservation status in Wales would be of value. The most effective means to conserve them is to conserve their habitat. Fortunately, both species primarily use habitat that is already protected – many Welsh ten-spined stickleback populations are on National Nature Reserves, whilst fifteen-spined sticklebacks utilise eel-grass beds, a habitat protected by the Habitats Directive.

In some parts of the world, sticklebacks occur in great numbers and have been turned into oil, animal feed and agricultural fertiliser. The three-spined stickleback is considered a pest in the Black Sea region of south-eastern Europe because it eats the young of fish which are caught for human consumption and it also competes with these fish for food.

Locally the three-spined stickleback can pose a conservation threat to more sensitive species, such as native amphibians, by feeding on the eggs and larvae of these species. Like other aquatic wildlife, it has been affected by pollution of its habitats and also drainage of ponds and ditches. It is well worth investing some time, sitting beside a suitable weedy pond and watching out for this colourful, intriguing part of our natural history. A glimpse of its sharp, spiny profile could just bring back long-forgotten childhood memories. Let's hope that many more generations of children will be able to enjoy these magnificent little fish.

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Cyflwyno'r crethyll

Bu crethyll ar y ddaear hon ers y cyfnod Miocen, 23-5 miliwn o flynyddoedd yn ôl. Maen nhw'n perthyn, o bell, i geffylau môr. Eu hoff gynefin yw dŵr bas sy'n orlawn o lystyfiant yn yr haf - boed yn nentydd a phyllau dŵr croyw, ffosydd, aberoedd, pyllau llanw, lagwnau neu ddyfroedd arfordirol. Yma, byddant yn hela, liw nos, ar amrywiaeth o greaduriaid di-asgwrn-cefn. Tri math o grothell sy'n byw yn nyfroedd Cymru. Y lleiaf yw'r grothell deg pigyn *Pungitius pungitius*, sy'n byw mewn dŵr croyw, lled-hallt neu hallt. Mae'r grothell bymtheg-pigyn *Spinachia spinachia* yn byw yn y môr neu mewn dŵr lled-hallt. Y mwyaf cyffredin o'r crethyll yw'r un dri-phigyn *Gasteorosteus aculeatus*.

Ry'n ni'n gwybod llawer am arferion magu hwn. Mae'r ceiliog coch a glas lliwgar yn dawnsio'n gelfydd i ddenu benywod i mewn i'w nyth o wymon a llystyfiant dyfrol. Bydd rhai ceiliogod, sydd heb diriogaeth, yn dangos ymddygiad hoyw gan fynd mewn i'r nyth a disodli'r benywod, hyd yn oed.

Ystyrir crethyll yn bla mewn rhai rhannau o'r byd, am eu bod yn bwyta wyau pysgod mwy gwerthfawr. Mewn mannau eraill cânt eu defnyddio i gynhyrchu olew, bwyd anifeiliaid neu wrtaith. Er bod llygredd a draeniad wedi effeithio ar gynefin crethyll ym Mhrydain, nid ydynt mewn perygl. Gwarchod cynefin yw'r ffordd orau o sicrhau dyfodol i'r creaduriaid rhyfeddol hyn.

Save Wildlife...
Stop Birdwatching!

©Natural England

It's time those who claim to be most concerned about wildlife started taking a lead, says ***ANDREW LUCAS.***

Mel Parry

Recently, I found myself at some traffic lights when an enormous, gleaming, silver SUV pulled up alongside me. At such moments I am insufferably smug. Here I am on my bicycle, saving the planet for all I'm worth, whilst some uncaring oaf sits behind the wheel of his CO_2-belching behemoth. But as he roared away, I noticed a sticker in the back window. It read "RSPB: For Birds, For People, For Ever".

The Royal Society for the Protection of Birds takes a strong and responsible line on climate change. It tells its members that it could eventually mean the end of mountain birds like the ptarmigan and dotterel, whilst many waders will go when their wetlands dry up. Indeed, it claims up to a third of all plant and animal species could go extinct in the next 50 years[1]. Research from America suggests that extinctions as a result of climate change could be particularly severe in biodiversity 'hotspots' like the Amazon or Indonesia[2]. But many who claim to be concerned for our natural heritage, like that SUV driver,

seem oblivious to the implications of their own behaviour. Why? They may not care about the drowning inhabitants of Kiribati or Bangladesh. But there will be fewer birds to see. This is serious.

Some birdwatchers drive incredible distances to see rare birds. One claimed to have clocked up 78,000 miles in Britain in one year. Another reckons he has driven millions of miles over the years, in pursuit of the next tick. They are the extreme end of the spectrum, but most birders will admit to travelling many miles in the course of their hobby. Some British birders will visit the Scillies, Norfolk, the Scottish Highlands or Fair Isle on an annual basis. Others indulge in year listing, which involves dashing around trying to see as many species as possible between January 1st and December 31st, only to start the whole futile process all over again the following year. The information that birders collect, through the system of county recorders, provides vital help to conserve birds and their habitats. But that data is collected by birders watching their local area, and reporting what they find, not chasing across the country to see a bird already found by someone else.

The birding community rightly condemns the tiny minority of twitchers who chase migrant birds or trample habitat. But birders never consider the impact of their own travel on the planet. In a saner world, driving 400 miles to see an exhausted waif that has just staggered across the Atlantic would be seen as incredibly irresponsible: the environmental equivalent of smoking a cigar in a day nursery. But we don't see it that way – it's just regarded as quaintly eccentric. In the unlikely event that I find, say, Britain's first mourning warbler hopping around my home, I would feel justified in suppressing news of its arrival simply to save the carbon that would be burnt by birders coming to see it.

Of course, it doesn't end with bird watching in Britain. Open any wildlife magazine and you'll find it stuffed with adverts offering to whisk you off to any part of the world you care to mention, in pursuit of birds, plants, insects, or wherever your interest lies. When naturalists gather, the talk will be of where they've been, what they saw and where they're going next. Mention the phrase 'carbon footprint', and you just get a sheepish grin.

The penny has dropped with a few wildlife tour companies, who now claim to be carbon neutral through the process of offsetting. It works like this; you travel as much as you like, but pay a small fee for someone in the third world to plant a tree, or get a slightly more efficient stove. This supposedly saves the CO_2 that you have blown flying half way around the world for a spoon-billed sandpiper. You don't have to worry about saving the planet. Those nice people in Malawi will do it for you.

Of course, there are problems. It will take your tree 60 years to grow to the point when it absorbs all that carbon. Will it get cut down in the interim? Was the

Peter Wakely/Natural England

Little egret

Michael Hammett

Ta-ta i adarydda gwallgo'

Mae'n hen bryd i bobl sy'n datgan eu cefnogaeth i gadwraeth natur ddechrau gweithredu fel tasen nhw o ddifrif am y peth. Pa ffwlbri anghyfrifol sy'n gyrru adarwyr i deithio cannoedd o filltiroedd i weld rhyw 'dderyn gwan sydd newydd lanio o wlad bell? 'Does fawr o werth i gofnodion yr adarwyr eithafol hyn. Ond mae cost uchel ynghlwm wrthyn nhw, gan fod cymaint o danwydd yn cael ei losgi wrth i'r adarwyr ruthro o wlad i wlad.

Er yn hallt eu beirniadaeth o naturiaethwyr eraill sy'n aflonyddu ar gynefinoedd a bywyd gwyllt, anaml y bydd adarwyr yn ystyried effaith eu gweithgaredd hwy eu hunain. Ac os yw cydwybod rhai yn procio, gall nifer o gwmnïau gwyliau ei leddfu drwy ddefnyddio peth o'u pres i gyfrannu 'iawndal carbon', at brosiectau 'gwyrdd' mewn gwledydd trydydd byd. Ond pa werth gwirioneddol sydd i hyn - pwy sy'n mesur? Ni ddaw technoleg newydd nag ateb syfrdanol i'n gwared ni rhag effeithiau'r hinsawdd. Newid ymddygiad personol a llosgi llai o danwydd yw'r unig ffordd i daclo'r broblem.

land where your tree grows needed for other purposes? Would the Malawians have had that efficient stove without your help? Who knows? But £20 is a small price to pay for guilt-free birding, so who cares?

To tackle climate change, before it gets beyond our control, is going to take radical cuts in CO_2 emissions. There is no magic solution, no miracle technology coming to our aid. It just means burning a lot less oil, gas and coal than we do now. I can't claim any moral high ground here. I've been lucky enough to pursue my interest in birds across Europe, North America, Southern Africa and Southeast Asia. I once drove over 100 miles to see my first British little egret. In 1981 it seemed to make sense. The little egret was an exotic Mediterranean species, conjuring up sweltering days in the Camargue or southern Spain. I needn't have bothered: global warming means there are now hundreds on my local estuary. But if we are really sincere about tackling climate change, we can't go on like this. It's time for those who say they care most about the environment to start behaving as if they do.

The survival of the Amazon or Antarctica now depends on me not going to see them. I'll just have to settle for a warm feeling from knowing that, for now, they're still there.

Andrew Lucas *lives and birdwatches in Swansea.*

1. See http://rspb.org.uk/policy/climate change/why/index.asp
2. Williams, John W., Jackson, Stephen T. and Kutzbach, John E. (2007). *Projected distributions of novel and disappearing climates by 2100 AD.* Proc. Natl. Acad. Sci. USA. See http://www.pnas.org/cgi/content/abstract/0606292104v1

Mel Parry

Pysgota cynaliadwy ar Ben Llŷn?

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Mae dulliau diwydiannol o bysgota yn bygwth bioamrywiaeth y cefnforoedd, ac mae'n siwr y bydd y dyn yn dioddef yn enbyd yn y pen draw. Mae KEITH JONES yn disgrifio sut y mae un gymuned bysgota fechan yn ceisio goroesi drwy weithredu ar lefel gynaliadwy er lles pobl a'r pysgod ry'n ni'n eu bwyta.

Irai, efallai, perthynas go anghyfforddus sy'n bodoli rhwng cynaladwyedd a physgota môr. Mae grymoedd mawr ar droed sy'n gyrru gweithgaredd pysgota ar hyd llwybr anochel ac annerbyniol. Ni all neb wadu bod ffactorau fel globaleiddio, y tueddiad cynyddol i gynaeafu cynnyrch môr ar raddfa ddiwydiannol a hefyd y cymorth a roddir i'r diwydiant gan lywodraeth yn dylanwadu'n fawr ar bysgota. Ac ar ben hyn i gyd, wrth gwrs, mae newidiadau hinsawdd ar ein gwarthaf, gyda'u heffaith pellgyrhaeddol ar dymheredd a chyfansoddiad dŵr y môr ac ar batrymau tywydd.

Mae'r newidiadau hyn i gyd yn effeithio'n sylweddol ar seiliau'r pyramid bwyd môr. Gallai hyn fod yn newyddion drwg i ni gyd. Bydd dyfodol bywyd gwyllt ein moroedd yn un tywyll iawn, os bydd pethau'n parhau i newid mor gyflym ag y maen nhw ar hyn o bryd.

Draw ym mhellafoedd Pen Llŷn, mae'r pwysau a'r cyfleoedd gwahanol sy'n wynebu un gymuned o bysgotwyr môr yn crisialu'r her fyd-eang i feithrin gwell perthynas rhwng dyn a'r amgylchedd morol. Mae cynaladwyedd yn rhywbeth sy'n cael ei gymryd o ddifrif ym Mhen Llŷn.

Mae'r môr o gwmpas Penrhyn Llŷn yn cynnwys toreth o riffiau craig a

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riffiau biogenaidd (riffiau sy'n cael eu creu gan organebau byw). Yn y moroedd hyn y ceir rhai o'r riffiau gorau ym moroedd Prydain. Ac maen nhw'n gartref i amrywiaeth o rywogaethau pwysig fel cwrel Ross (*Pentapora foliacea*) cregyn gleision (*Musculus discors* a *Mytilus edulis*, neu farchfisglod *Modiolus modiolus*) a fforestydd o wymon deri'r môr (*Halidrys siliquosa*). Yn y rhannau dyfnaf o'r riffiau ceir biotopau gyda chyfoeth o anifeiliaid (mae'r term 'biotôp' yn cyfeirio at y 'cynefin' ffisegol a'i 'gymuned' fywydegol). Ymhlith y creaduriaid hyn mae cramenogion, cnidariaid, sbyngau, hydroidau a bryosoaid crwstog.

Mae'r ardal hon o fôr yn un rhyngwladol bwysig a disgrifiwyd hi fel 'y Barrier Reef Prydeinig'. Mae'n rhan o Ardal Cadwraeth Arbennig Pen Llŷn a'r Sarnau. Mewn cyfnod o ansicrwydd i'r amgylchedd morol, yr un yw'r her fan hyn, yng ngogledd-orllewin Cymru, â'r un sy'n bodoli ar hyd a lled y byd. Ond mae yma gyfleoedd hefyd.

Y darlun mawr

Nôl yn 1992, collodd 40,000 o bysgotwyr eu gwaith yng Nghanada. Er cael sawl rhybudd, digwyddodd hyn pan ddarfu pysgodfa benfras y Canadian Grand Banks, yng ngogledd y Môr Iwerydd, dros nos bron - er iddi ymddangos ar un adeg yn ffynhonnell ddiderfyn. Roedd yr effaith ar ddiwydiant pysgota Canada yn drychinebus. Os bydd pysgota'n parhau i fod mor ddwys ag y mae ar hyn o bryd, mae'n bur debyg y bydd y cyflenwad penfras ar hyd a lled y byd wedi darfod yn llwyr o fewn y bymtheg mlynedd nesaf.

Dyma enghraifft arall o agwedd 'klondike' at bysgota. Nid yw'n ffenomenon newydd sy'n digwydd ymhell i ffwrdd. Gwelsom yr un peth yn digwydd o gwmpas ein glannau, yma ym Mhrydain. Pam, felly, rydyn ni'n dal i feddwl y gall y môr barhau i ddiwallu ein hanghenion i gyd, waeth beth fo'r cynnydd yn y boblogaeth ddynol, neu'r datblygiadau mewn technoleg a dulliau pysgota.

Yn ei adroddiad blynyddol, mae'r Marine Stewardship Council yn datgan fel hyn:

- Mae cyfanswm byd eang y cynnyrch a geir o bysgodfeydd gwyllt wedi codi o 19 miliwn tunnell yn 1950 i 90 miliwn tunnell heddiw
- Ystyrir bellach bod chwarter y stoc pysgod ar hyd a lled y byd yn cael ei or-ecsploetio neu wedi cael ei ddisbyddu. Ystyrir bod 50% pellach yn cael ei 'ecsploetio'n llawn'.

A WYDDOCH CHI?...
Yn gyffredinol daliwyd 70% yn llai o benfras dros y 30 mlynedd ddiwethaf.Daliwyd 3.1 miliwn o dunelli yn 1970 a dim ond 950,000 tunnell yn 2000.

Yn agosach at adre' mae peryg' y gallai poblogrwydd cyfredol cregyn bylchog ('scallops'), ynghyd â'r diffyg gwybodaeth amdanynt, arwain at arferion 'klondike' unwaith eto. Gan fod cregyn bylchog nawr yn ymddangos ar fwydlenni gwestai ac ar raglenni coginio ar y teledu, mae'r farchnad yn awchus amdanynt. Caiff cregyn bylchog eu dal mewn un o ddwy ffordd. Y dull caredicaf, o safbwynt yr amgylchedd, yw cael eu casglu â llaw gan ddeifwyr, ond maen nhw hefyd yn cael eu casglu gydag offer carthu trwm sy'n cael ei lusgo tu ôl i longau. Mae pysgota am gregyn bylchog yn enghraifft dda o ddiwydiant yn canolbwyntio ar y cnwd tra'n anwybyddu'r ffaith fod y dulliau cynaeafu yn dinistrio'r union gynefin sy'n allweddol ar gyfer y cynnyrch. Pe byddem yn clywed am fforest law yn cael ei dinistrio ychydig o filltiroedd i ffwrdd (ac mae'r cynefin tanfor hwn yr un mor allweddol o bwysig) mae'n siŵr y byddai gan bobl rywbeth i'w ddweud. Yr hyn sy'n ychwanegu at ddifrifoldeb y sefyllfa yw bod yr arfer hwn o garthu am gregyn bylchog yn effeithio

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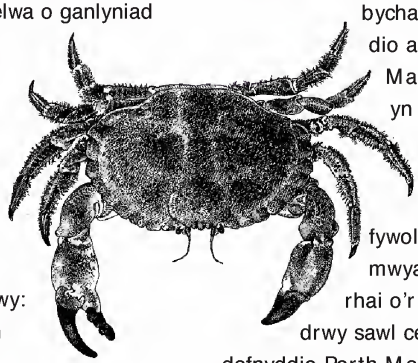
ar fywoliaeth pysgotwyr eraill sy'n casglu bwyd môr (fel cramenogion) o'r un math o gynefin tanfor.

Beth sydd a wnelo hyn â meddiant yr Ymddiriedolaeth Genedlaethol ym Mhen Llŷn? Mae'r Ymddiriedolaeth Genedlaethol, fel mudiad, yn datblygu agweddau a pholisïau mwy cynaliadwy o safbwynt caffael bwyd. Mae polisi 'O'r Llain i'r Llestr' yn cynnwys agweddau ar ddefnyddio a chynhyrchu bwyd. Ar y tir, mae'r polisi hwn wedi arwain at ddyfarnu safon 'gwobr bwyd fferm o ansawdd uchel' am ddefnyddio dulliau cynaliadwy o gynhyrchu bwyd. Mae'r polisi bellach yn datblygu mewn cyd-destun morol. Mae rhai mathau o bysgod a physgod cregyn yn cael eu cymeradwyo ar gyfer bwytai'r Ymddiriedolaeth Genedlaethol. Drwy wneud hyn, gallwn ddangos bod ein gwaith a'n penderfyniadau yn rhoi ystyriaeth ddyledus i'r amgylchedd morol. Mae sawl safle o gwmpas Prydain wedi elwa o ganlyniad i'r sylw ychwanegol hyn a roddir i gynaladwyedd y diwydiant pysgota. Mae dau safle wrthi'n cael eu datblygu ar hyn o bryd, er mwyn dangos cynaladwyedd ar waith. Un o'r rhain yw Brancaster Staithe ar arfordir Norfolk, sy'n bwysig ar gyfer crancod a physgod cregyn Cromer. Yr ail safle yw Porth Meudwy: bae bychan ym mhen draw Penrhyn Llŷn.



Ar un adeg byddai casgliad o gychod pysgota wedi bod yn brysur ym mhob bae bychan o gwmpas Penrhyn Llŷn. Pysgotwyr rhan-amser fyddai wedi bod yn cynnal y diwydiant, gan gyflenwi marchnadoedd lleol. Wrth edrych yn sydyn ar fap o Ben Llŷn, mae'n hawdd gweld, mewn enwau lleol fel Porthysgaden, pa mor bwysig y mae pysgota wedi bod i economi a thirlun diwylliannol Cymreig yr ardal. Fel ag sy'n wir mewn nifer o ardaloedd eraill, mae pysgota wedi effeithio ar arferion ac iaith y fro.

Mae Porth Meudwy'n cynrychioli un o'r baeau pysgota olaf ym Mhen Llŷn. Mae felly'n ddolen gyswllt gyda threftadaeth fyw yr ardal - sy'n cynnwys sgiliau lleol a gwybodaeth fanwl a chyfoethog ynglŷn â'r modd y mae pobl wedi gweithio a byw yn gynaliadwy dros gyfnod maith. Mae'r bae yn rhan o fferm Cwrt, sy'n dyddio nôl dros fil o flynyddoedd ac sy'n gallu brolio cysylltiadau hanesyddol gydag ynys Enlli. Mae'r lôn gul garegog, sy'n arwain o'r fferm i lawr at y bae, yn dal i fod yn hanfodol ar gyfer rheoli ynys Enlli. I lawr yn y bae mae 'na adeilad bychan rhestredig sy'n cael ei ddefnyddio ar gyfer storio offer pysgota. Mae'r rhai sy'n ymweld â Phen Llŷn yn adrodd nôl yn gyson eu bod yn mwynhau gweld pysgotwyr wrth eu gwaith. Mae gweithgaredd pysgota'n cyfrif, yn rhannol, am fywoliaeth chwe physgotwr lleol - y mwyafrif ohonynt yn rhan amser. Gall rhai o'r rhain olrhain eu teuluoedd nôl drwy sawl cenhedlaeth o bysgotwyr a fu'n defnyddio Porth Meudwy i ennill rhywfaint o'u bara menyn.

Ar hyn o bryd mae Porth Meudwy a fferm Cwrt wrthi'n cael eu huwchraddio fel y gallant gynnig cyfleusterau i gynnal y diwydiant pysgota lleol a'i

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Porth Meudwy

annog i fod yn fwy cynaliadwy, o safbwynt economaidd ac amgylcheddol. Mae'r prosiect Amcan Un ym Mhorth Meudwy yn bwriadu datblygu cyfleusterau a fydd yn ei gwneud hi'n haws i lanio cychod yn y bae. Ac fe fydd yr addasiadau ar fferm Cwrt yn creu gofod pwrpasol fel y gall y pysgotwyr storio'r cynnyrch yn oer. Yn y pen draw bwriedir cyflwyno systemau a fydd yn amrywio ac yn ychwanegu gwerth at y cynnyrch.

Oherwydd yr economi fyd-eang, a'r ffaith bod bwyd nawr yn cael ei drin fel nwydd, mae'r rhan fwyaf o bysgod cregyn sy'n cael eu dal ym moroedd Pen Llŷn yn cael eu gwerthu i fasnachwyr sydd wedyn yn gwerthu'r cynnyrch eto i farchnadoedd rhyngwladol. Weithiau, gwelwn sefyllfa ddwl lle mae crancod lleol yn cael eu gwerthu i Sbaen a Phortiwgal a ninnau wedyn yn prynu'r cig cranc yn ôl o'r un gwledydd! Drwy brosesu'r cynnyrch yn lleol gall y pysgotwyr lleol gynyddu eu helw yn sylweddol – sy'n golygu nad oes raid iddynt bysgota yn fwy dwys drwy'r amser er mwyn cynnal yr un safon byw. Mae'n gofyn am fwy o waith marchnata, wrth gwrs, ond mae'n lleihau'r milltiroedd bwyd, yn cynyddu elw ac yn galluogi'r cwsmer i olrhain tarddiad y cynnyrch yn haws.

Deuoliaeth

Rydym yn gyfarwydd gyda'r effaith 'Klondike,' sy'n denu pobl i wneud elw yn y tymor byr - ond ar draul rhywogaethau, cynefinoedd a phobl leol. Drwy gadw rheolaeth ar y bae ac ar y nifer a'r math o gychod a gaiff ddefnyddio'r safle, mae'r Ymddiriedolaeth Genedlaethol, yn anelu at sicrhau twf cyson a chynaliadwy yn y diwydiant bwyd môr lleol. Ond mae cydweithio gyda'r pysgotwyr lleol, a hefyd gyda'r asiantaethau eraill, yn hollol hanfodol i lwyddiant y fenter.

Gan fod y pysgotwyr lleol yn pryderu cymaint am ddyfodol y bysgodfa, fe aethon nhw ati'n ddiweddar i ffurfio cymdeithas bysgota cynaliadwy Pen Llŷn. Gwnaed y penderfyniad ar sail amgylcheddol ac economaidd. Ymhlith y prosiectau eraill sydd ar y gweill y mae'r gwaith o osod nod-V ar gimychiaid; mae hyn yn digwydd er mwyn cadw cymaint â phosibl o gimychiaid benywaidd o oedran magu. Torri marc siâp V ar gynffon y cimychiaid benywaidd sy'n cael eu dal, cyn eu gollwng yn ôl i'r môr. Drwy wneud hyn, gobeithir y bydd modd sicrhau hyfywedd y boblogaeth. Unwaith y bydd y cimychiaid wedi derbyn y nod-V maen nhw wedyn yn cael eu gwarchod gan is-ddeddf 31, sy'n gwahardd unrhyw un rhag cymryd cimwch wedi ei farcio (mae'r nod-V yn diflannu ar ôl rhai blynyddoedd o dyfu). Yn anffodus, mae 'na ddiffyg ymwybyddiaeth ynglŷn â hyn ymhlith rhai elfennau o'r garfan sy'n plymio ac mae rhai o'r cimychiaid mawr hyn wedi cael eu cymryd o'r môr.

Mae math newydd o gawell cimwch hefyd yn cael ei ddatblygu; bydd modd i gimychiaid sy'n rhy fach i gael eu dal ddianc allan o hon.

Y dyfodol

Tu hwnt i'r ffin 12 milltir, ym Môr Iwerddon, y mae'r 'arch-gawellwyr'. Rhain yw'r cychod sy'n cynnwys dros 3000 o botiau ac sy'n casglu popeth a ddaw'n agos atynt. Mwy heriol fyth yw'r cychod mawr cofrestredig Cymreig, sydd bellach yn gweithio ar hyd arfordir Cymru ac yn gorfod dal cyfanswm anferth o greaduriaid môr er mwyn cwrdd â'u costau uchel eu hunain.

Yn ddiweddar, daeth cyfarwyddwr un o gwmnïau bwyd mwyaf Prydain i gyfarfod ym Mhorth Meudwy. Ei nod oedd trafod her a osodwyd gan rai o'r bwytai gorau ym Mhrydain, sef sicrhau cyflenwad o gramenogion o ffynhonnell gynaliadwy. Mae'r ymweliad diweddar hwn yn argoeli'n dda i bysgotwyr bychain rhan amser - boed ar Ben Llŷn neu mewn unrhyw fan arall. Mae'r farchnad, o'r diwedd, yn dechrau gweld beth yw gwir effeithiau systemau diwydiannol ac mae'r cwsmer yn

dechrau mynnu bod ffynonellau bwyd yn gynaliadwy ac yn hawdd i'w holrhain. Er nad yw crancod heglog wedi cael rhyw lawer o groeso mewn cawelli cimwch yn y gorffennol, mae'n ymddangos bellach eu bod yn dderbyniol fel cnwd cynaliadwy! Drwy weithio gyda'r farchnad mae'n bosib iawn y gall pysgotwyr Llŷn edrych ymlaen at ddyfodol mwy llewyrchus, cyn belled â'u bod yn cofio am wersi'r gorffennol ar yr un pryd.

Er mwyn cwrdd â'r farchnad gynyddol hon, dim ond un safon cynaladwyedd wnaiff y tro, sef y Marine Stewardship Council Certification. Dyma'r 'safon aur' o safbwynt olrhain tarddiad bwyd. Fel y dangosodd Rio, mae cynaladwyedd yn cwmpasu llawer mwy na'r amgylchedd. Rhaid sicrhau cydbwysedd gyda datblygiad cymunedau hyfyw ac economi lewyrchus, os ydym am weld pysgota yn parhau ar Ben Llŷn.

Rohan Holt

*Mae **Keith Jones** yn gweithio i'r Ymddiriedolaeth Genedlaethol fel Rheolwr Cefn Gwald Gorllewin Eryri a Phen Llŷn. Fe hefyd yw'r rheolwr prosiect ar gyfer menter bysgota Porth Meudwy.*

Gwybodaeth bellach am Ardaloedd Gwarchod Arbennig (AGA), safleoedd sy'n gymwys i gael eu hadnabod fel Safleoedd o Bwysigrwydd i'r Gymuned (SBG) ac Ardaloedd Cadwraeth Arbennig (ACA)
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Geirfa MarLIN - http://www.marlin.ac.uk

Rohan Holt

Sustainable fishing on Llŷn?

Industrial fishing is threatening the biodiversity of the oceans, and as always with the misuse of the environment, the chickens will come home to roost. **Keith Jones** describes how a small fishing community, based around Porth Meudwy, one of the last working fishing coves on the Llŷn peninsula, is trying to stay in business. This runs against the trend of increasingly industrial fishing, with food being treated as a commodity; much of the shellfish caught off the Llŷn is sold to intermediaries, who then sell the produce on the international market. In contrast, what the fishing community is doing on Llŷn benefits both people and a unique marine environment, including the fish and shellfish that support this small sustainable industry.

For an electronic or hard copy of this article in English, please contact the Editor.

Conserving Red Squirrels in the forests of mid Wales

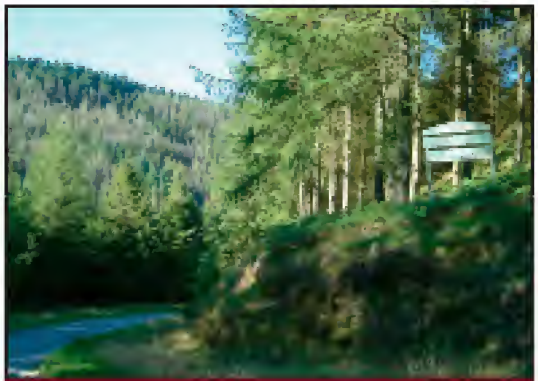
Paul Glendell, Natural England

Potentially viable red squirrel populations survive in only three places in Wales. Facing a precarious future, the genetically distinctive reds of the mid Wales forests need firm political resolve coupled with rapid action to turn their forestry home into a defensive fortress. A partnership of organisations has taken up the challenge, as ISABEL MACHO reports.

The red squirrel in Wales is under real threat. The conservation of a species depends, more often than not, on the retention and enhancement of its habitat. When the habitat that the species has come to depend upon for its survival is a commercial forestry plantation of non-native conifers, the issues facing its conservation are complicated by timber economics. In addition, any conservation success is going to be hard fought when a major factor in the current decline of the species is the relentless advance of a controversial, non-native species which, through competition and virus transmission, has forced the retreat of the native species from its natural habitat into the man-made refuge.

Significant populations of red squirrels now only occur within three locations – Anglesey, Clocaenog Forest (north Wales) and mid Wales (with other sporadic reports elsewhere) and, despite work being undertaken in all three areas, the squirrel's future is by no means secure. Loss and fragmentation of its adopted habitat through unsympathetic forestry

Huw Denman



Tywi Forest

operations, and the lethal competition from grey squirrels, means that this a critical time for the conservation of this species in Wales. We have to face the real prospect that, unless decisive action is taken today, we will lose all our Welsh red squirrels.

The Mid Wales Red Squirrel Project's recent survey of Tywi Forest has provided the group with some important information about the status of reds in this forest. However, any success in conserving and enhancing the native population will depend on action at both local and national levels. The reasons for the decline of red squirrels are now well established: loss of habitat was historically the single threat, but more recently competitive exclusion by the introduced grey squirrel and the transmission, by greys, of the lethal squirrel-pox virus have become key factors. Bold decisions are urgently required to address the threats affecting red squirrels in our forests, and political commitment is an essential ingredient necessary to ensure the successful conservation of this iconic native species, which is part of our rich Welsh biodiversity.

The Mid Wales Red Squirrel Project

The Mid Wales Red Squirrel Project (MWRSP), set up in 2002, is a partnership of Carmarthenshire, Powys and Ceredigion County Councils, Forestry Commission Wales, Countryside Council for Wales, Wildlife Trusts and private forest managers.

Previous work had established that, although in the 1990s red squirrels were present in a number of large forests in mid Wales, there had been a significant contraction in range since the 1980s. Studies in 2001 found greys to be widespread, with the species dominating the hair tubes used in the survey, and this did not give a true reflection of red distribution. It was concluded then that a programme of grey squirrel control was vital for red survival in the forests.

Subsequent (2003) review of the suitability of mid Wales forests for red squirrels (in light of current forest design plans and reality of long-term forestry operations) demonstrated that, whilst suitable habitat would continue to exist, it would be fragmented and, if inappropriate broadleaf plantings were increased, the balance could be further tipped in favour of grey squirrels.

This work led to a Species Challenge Fund bid by the Project in 2004. The principal aim was to demonstrate the presence of red squirrels through live-capture trapping. A second objective was to control greys in the study areas to reduce competition and improve the chance of catching reds. Squirrelpox virus analysis could then be undertaken within the grey population.

Findings of the project

During two survey periods over 18 months, 32 red (from three sites) and 121 grey (from all sites) squirrels were trapped. Reds caught were free from visible signs of disease and included animals in breeding weight, juveniles and a pregnant female, all positive signs of a currently actively breeding population.

DNA analysis revealed four different mitochondrial DNA haplotypes. (Mitochondrial DNA is inherited from the maternal line and is useful in studies of population ancestry.) Two of these haplotypes are found in reds elsewhere in Wales, from Pentraeth on Anglesey and Clocaenog Forest, but two appear to be unique to mid Wales. Significantly, this was the first time all haplotypes had been recorded within a single locality in Wales. Results indicate that red squirrels in mid Wales are likely have a solely Welsh lineage and have been less influenced than other British populations by the introduction of European red squirrels to the UK in the 19th century.

Paul Glendell, Natural England

Four haplotypes within a single population indicates that the mid Wales population is important as a reservoir of genetic diversity. The other native Welsh populations have limited genetic variability and this may be a further threat to their future viability. One potential conservation strategy is to augment small isolated populations from larger stable groups, and already on Anglesey a captive-breeding programme uses animals obtained from other British populations. But for this to be a long-term conservation strategy we need to ensure that we have a red squirrel population in mid Wales to conserve, and that the current survey has not just been an exercise of recording a population heading for extinction.

Squirrelpox virus was found in 50-90% of greys from the various mid Wales trapping sites. Significantly larger numbers of greys than anticipated were trapped in one of the most remote survey sites in the north of Tywi forest, some distance from broadleaved woodland. Their size indicated that they are breeding in the coniferous forest and not just moving in from adjacent broadleaved habitat only when resources are scarce.

Are we too late?

The situation is critical. Even though the area of conifer in mid Wales is large, only a very small area is optimal for reds, as the conifer species favoured by them (Norway spruce, Scots pine, Japanese larch and lodgepole pine) are only at very low density. The Project has been consulted in the current review of FC's Tywi Forest Design Plan – the outcome of this will be vital in determining the future survival of reds and it is important that the Project is clear about its aspirations for the management of the forest.

The red squirrel partnership wants Tywi forest be designated a *Red Squirrel Reserve* with red squirrel conservation as one of its primary management objectives. The group firmly believes that this need not significantly compromise the commercial interests of these forests. Despite forest managers (public and private) having other, sometimes conflicting, management objectives the Project feels strongly that red squirrel conservation *can* be a primary management objective alongside other conservation / management targets, without compromising them. In fact, in some parts of the mid Wales forests, managers are already

Huw Denman

demonstrating how they can simultaneously meet the objectives of timber production and red squirrel conservation. Management should look to increase areas of suitable habitat for reds, maintaining and improving connectivity and so preventing fragmentation of remaining populations.

Given the unexpected numbers of grey squirrels present, it is a priority that we control them throughout the forest, with the aim of eradicating them in the focal areas and controlling them within buffer zones. Corridors of likely encroachment into the forest also need to be targeted for control.

It should not be forgotten that WAG, the Forestry Commission and the Countryside Council for Wales have a duty to protect and conserve this species – red squirrels are protected under Schedule 5 of the Wildlife and Countryside Act 1981, are a priority Biodiversity Action Plan species, and are listed as a species of principal importance to the conservation of biodiversity in Wales under section 74 of the CRoW Act. The drivers for its conservation are there but is there the will at the highest level? We need a policy for grey squirrel control, and to ensure the resources are available for landowners to keep up the constant effort required to eradicate greys. A policy has been adopted in England but it is disappointing that feet appear to be dragging in Wales.

Recently it has been argued that red squirrels can only effectively be conserved on islands, and that it is uneconomical and unviable to continue with conservation effort elsewhere. The MWRSP believes that given the isolated nature of Tywi forest a 'terrestrial island' can be created.

The conservation of a species can be argued for on many levels. At a local level, those of us who live and work in mid Wales value and want to conserve as rich a biodiversity as possible and not accept the gradual homogenization of our wildlife. Every species lost is like the dimming of a light in a room, your eyes adjust to it and you get used to it but the quality of your experience diminishes. The solution for red squirrels is there but are we bold enough to adopt it?

Isabel Macho *is Biodiversity Officer for Carmarthenshire and a member of the Mid Wales Red Squirrel Project.*

Dyfodol i'r wiwer goch yng nghoedwig Tywi?

Dim ond mewn tri lle yng Nghymru y mae'r wiwer goch yn byw – Ynys Môn, coedwig Clocaenog a chanolbarth Cymru. Ar waetha'r ymdrechion i wella cynefin ar ei chyfer yn yr ardaloedd hyn nid yw ei dyfodol yn sicr.

Mae diflaniad cynefin, cystadleuaeth gan wiwerod llwyd a feirws marwol oll wedi cyfrannu at ddirywiad y wiwer goch. Yn 2004, sefydlwyd prosiect yng nghoedwig Tywi er mwyn cadarnhau presenoldeb y wiwer goch a hefyd i reoli'r gwiwerod llwyd. Yn sgil y prosiect hwn, darganfuwyd bod wiwerod coch Coedwig Tywi o dras Gymreig fwy pur na phoblogaethau eraill Prydain. Mae'r boblogaeth hon, felly, yn gronfa enetigol werthfawr ymhlith wiwerod coch Cymru.

Er yr awydd i gryfhau statws y wiwer goch yng nghanolbarth Cymru, rhaid profi'n gyntaf nad yw hon yn boblogaeth sy'n carlamu at ddifodiant. Mae partneriaeth o gyrff cefnogol yn credu bod modd sefydlu gwarchodfa wiwerod coch yng nghoedwig Tywi, tra'n cynnal fforest fasnachol lewyrchus ar yr un pryd. Ond rhaid sicrhau bod digon o gynefin addas ar gyfer y cochion, a digon o gysylltiad rhwng y darnau hyn o gynefin da. Rhaid rheoli'r llwydion ar frys hefyd, yn enwedig gan eu bod nhw'n dewis magu mewn coedydd coniffer yn yr ardal hon – ac nid dim ond yn symud i'r cynefin hwn o goetir collddail cyfagos pan fod amodau'n anodd. A oes yr un brwdfrydedd i weithredu ymhlith y cyrff llywodraethol tybed?

Bees...
their future in our hands

Apart from honey bees and bumblebees, most of us are scarcely aware of the other 230-odd species of native bees, yet ecologically speaking they are a very important group of insects. MICHAEL HAMMETT gives a flavour of this varied group of insects, and the threats which they face.

Shrill carder bee, *Bombus sylvarum*, on knapweed

All bee photographs by Michael Hammett

Many our native bees are under threat and in urgent need of our support. They are our most important pollinators and without them we will be in serious trouble. In recent decades silage has replaced hay and hay meadows have disappeared, banks have been levelled, quarries landscaped and the countryside tidied up. In the process, food sources and nest sites for bees have gone, and most species have declined in abundance and distribution.

The picture is not quite as depressing as it sounds, for two reasons. First, we have some superb habitats for bees, such as extensive sand dune systems, giving us exceptional locations like Castlemartin Range, home of the shrill carder bee (which Annie Haycock wrote about in *Natur Cymru* 15). Secondly, there is much we can all do to help bees, and many of us want to help. The Bumblebee Conservation Trust, which has grown from nothing into an influential and active voice for these iconic insects, is running campaigns to encourage people to provide nest sites for bumblebees in their gardens. The creation of 'bee banks', encouraging the kind of tussocky vegetation which many bees use, and increasing the numbers of wild flowers in the countryside are examples of the positive steps that can be taken to help these attractive and valuable insects. So what exactly do we mean when we talk about bees?

Bees are all grouped together in the family *Apoidea* which is part of the order *Hymenoptera* that includes

sawflies, ants, and wasps. Bees are the most advanced members of the order and can be identified by the presence of branched hairs on the body, and often pollen baskets on the rear legs of the females. There are 254 species of bees in Britain of which 230 species are solitary and 24 species are social. The latter includes 17 bumblebees, six cuckoo bumblebees and our honey bee. Cuckoo bumblebees do not produce workers but subjugate the workers of other bumblebees to raise their young by using powerful pheromones. They usually kill or eject the host queen. The 230 solitary bees are split into a number of families and these include mining bees, cuckoo and nomad bees, mason and leaf-cutter bees, plus a few exceptions that don't seem to fit exactly into these groups. All species of solitary bees produce only females and males; however many of them do live in colonies where each female has her own apartment or apartments.

The red mason bee, *Osmia rufa*, can cause problems burrowing into mortar

Bee habits

Here are a few more interesting facts about bees. Only females and workers can sting and the honey bee is the only species that has a barbed sting. The barb becomes lodged in human skin and its attached poison sack continues to pump poison into you. The bee then dies shortly afterwards. The honey bee is the only species that indicates to other members of the hive where a good source of food is available, using its famous dance. It is also the only species that may fly up to two miles to gather food. All the others rarely fly more than 400 metres from their nest. Bees are herbivores feeding only on pollen and nectar. Despite the fact that they are cold blooded, some can warm themselves up by several degrees. This is done by pulsing their abdominal muscles and then vibrating their wings. Other bees rely on the warmth of the sun.

For years scientists wondered how bumblebees could fly as their wing area seemed too small to lift the weight of the insect. It seems that they use the same principle as a helicopter obtaining lift just prior to forward movement. This makes their take-off a little slower than other insects. Only the bumblebee queens can live for twelve months. Young queens are produced at the end of the summer, just after males, and they mate in the autumn. Males die shortly afterwards but the young queens hibernate over the winter so that they can start in the early spring to create a new colony. The old queen and all the workers die each year in the late autumn. Female cuckoo bumblebees also hibernate over winter and become active about five weeks after their host has appeared the following spring. Honey bee queens have been known to survive for several years. Our solitary bees overwinter as pupae and all of the adults die before the autumn. Males are the first to appear in the spring and these mate with freshly emerged females before dying shortly afterwards. This does not mean that they are not very busy

The cuckoo bee *Nomada leucopthalma* (right) will lay its eggs in the nests of *Andrena clarkella* (left)

during their brief lives. They are capable of mating with a good number of females and so are much less commonly seen. During this spring I observed males of the red mason bee *Osmia rufa* patrolling potential nest burrows. They waited until freshly emerged females hovered in front of the burrows and then hit them from behind causing the pair to drop to the ground. If the female had not mated beforehand she then allowed him to mate with her. If she had already mated he was vigorously thrown off her back, then she flew off to resume her duties.

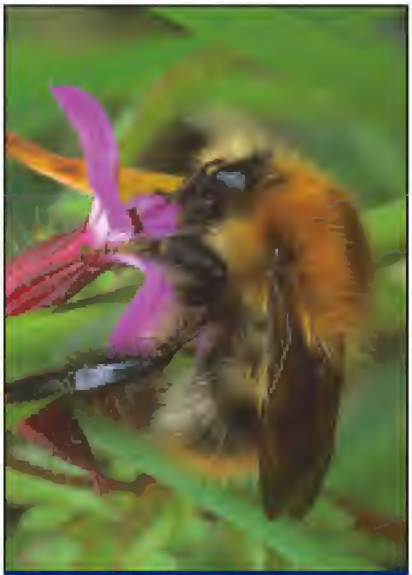
Natural dangers

Bees have many predators and these include the varroa mite which has decimated honey bee colonies in Wales and throughout much of the world. There are also nematode worms, the velvet ant, a species of mite, parasitic flies and the bee moth, all of which kill their victims either as grubs, pupae or adults. The majority of these predators concentrate their attack on the social bees. Badgers are also very fond of wild honey and grubs. Some birds and the larger dragonflies take adults whilst they are foraging, and woodpeckers sometimes drill holes in honey bee hives to get at the larvae. Cuckoo bees offer a considerable threat to our solitary bee species. Wild social bees have their 'clean-up' brigade and these include a larger species of mite, the larvae of the hoverfly *Volucella bombylans*, and larvae of the wax moth, all of which live inside the nest or hive.

Each family of bees has its own lifestyle. A good proportion of the solitary species are mining bees and these are split into several families. The largest family, *Andrenidae*, contains 68 species and has some members that are the earliest to appear in spring. *Andrena clarkella* emerges in March and is shortly followed by the better known tawny mining bee *Andrena fulva*. The latter species is sometimes referred to as the lawn bee because the females frequently dig burrows in lawns. All members of this family dig burrows with side channels into which they place a supply of pollen and nectar to feed a single grub. Once this is done the chambers in each tunnel are sealed off in order to protect their offspring. Unfortunately, whilst this operation is in progress, 'nomad' or 'cuckoo' bees enter the open burrows, when the female is away foraging, and deposit their own egg in each prepared chamber. The nomad bee *Nomada leucopthalma* is known to attack nests of *Andrena clarkella*. Other species of mining bees occur in the families *Colletidae* and *Halictidae*. A few mining bees, including the long-horned bee *Eucera longicornis*, occur in the family *Anthophoridae* which also contains the nomad bees. The type of habitat utilised by each of the mining bees is considerable and may range from soft sand in dune systems, to hollow plant stems and earth banks.

My favourite solitary species are the mason and leaf-cutter bees in the family *Megachilidae*. This family contains some real characters, one of which can

cause us problems. The red mason bee normally constructs burrows in hard, dry sandy banks; however, it also has an affinity with mortar and has been known to cause severe structural damage to old walls with worn mortar. My absolute favourite is the snail shell bee *Osmia aurulenta* which uses empty snail shells to house about 6 cells made of plant material. I must also mention the leaf-cutter bee *Megachile willughbiella* whose male has attractive white structures on his forelegs. Both mason and leaf-cutter bees construct cells inside their burrows or brood cavity and these can be made of mud or plant material. Each one is stocked with a supply of pollen and nectar for the single grub which is sealed inside it.



Common carder bee *Bombus pascuorum*

Bumblebees and carder bees

Finally, I must say a little more about our bumblebees that are placed in the family *Apidae*. Depending upon the species, the fertile queens emerge from hibernation between March and May and set about finding a suitable nest site. Our earliest species, the buff-tailed bumblebee *Bombus terrestris*, usually chooses a disused mouse burrow which she locates by its smell of mouse urine. She makes or selects a chamber and stocks this with a pollen mass which has a depressed centre into which she lays some eggs. These she tends carefully, sitting over them to warm them with her own body if required. She also constructs a nectar pot for herself and continues to rear this first brood until they emerge as workers. The queen prevents these workers from reproducing using a powerful chemical pheromone. Their job is to construct further wax nectar pots and gather pollen and nectar for the next brood. They also have to keep the nest clean and tend to the new offspring.

The total brood size for bumblebees may vary between 40 and 150 depending upon the species and the quantity of food available. Not all species nest underground as some prefer grass tussocks or

Willughby's leaf-cutter bee *Megachile willughbiella*

tree holes. Even old birds' nests and bird boxes are sometimes chosen. There are a small number of bumblebee species that are referred to as 'carder' bees and the commonest is the common carder bee *Bombus pascuorum*. This is the brown bumblebee that is commonly seen in your garden. The carder bees collect moss to build their nests on the surface of the ground amongst rough grassland.

Generally speaking all bee species are under threat in this country and some are now close to extinction. Modern agriculture and the production of silage in our countryside have taken a heavy toll on bee populations. It would be in all our interests, including those of farming, if more land was returned to these beautiful insects, and the flowers which provide them with nectar and pollen. Above all, a

return of flower-rich meadows, the most valuable and threatened of all bee habitats, would make a huge difference. Techniques are being developed so that wild flower meadows can once again be an everyday part of our lives.

Let's hope the will and resources are made available, and we will be able to give a positive answer to Hamlet's famous question 'To bee, or not to bee.'

MICHAEL HAMMETT is an entomologist and wildlife photographer.
See bee distribution maps on www.nbn.org.uk

Gwenyn gwyrthiol

Mae gwenyn yn prinhau, a hynny'n bennaf oherwydd newidiadau yn ein cefn gwlad. Ond mae gan Gymru nifer o gynefinoedd ardderchog ar eu cyfer o hyd, a gallwn wneud llawer i helpu'r creaduriaid pwysig hyn.

Ceir 254 rhywogaeth o wenyn ym Mhrydain. Mae rhai yn gymdeithasol, eraill yn unigolyddol a rhai yn dodwy wyau 'cwcw' yn slei yn nythod rhywogaethau eraill. Paill a neithdar yw eu hunig fwyd ac mae'r mwyafrif ohonynt yn aros yn agos at y nyth. Dim ond y wenynen fêl sy'n teithio'n bellach, i fyny at 2 filltir, ac yn 'dawnsio' i ddangos i'w pherthnasau ym mha le y mae'r bwyd. Byr yw oes gwenynen ac mae patrwm a ffordd o fyw pob teulu yn wahanol. Bydd rhai, er enghraifft, yn turio mewn i bridd neu forter er mwyn creu nyth a bydd eraill yn casglu mwsogl ac yn nythu ar ben twmpath glaswellt neu mewn hen flwch nythu. Mae un math yn dodwy wyau mewn hen gragen malwen. Ac mae gwenynen bwm gynhara'r gwanwyn yn darganfod twll llygoden addas drwy synhwyro arogl piso'r llygoden! Mae rheolaeth y frenhines a'i fferomonau dros ddatblygiad yr wyau, a gweithgaredd trefnus y gwenyn drwy gydol y tymor, yn hollol ryfeddol.

Caiff gwenyn eu hysglyfaethu gan adar, llyngyr, moch daear a gwesynnod. Mae'r gwiddon varroa hefyd wedi difa gwenyn mêl ym mhobman. Ond diflaniad gweirgloddiau yw'r bygythiad pennaf. Rhaid diogelu'r cynefin hwn os am weld parhad ein gwenyn gwych gyda'u haddasiadau rhyfeddol a'u patrymau diddorol o fyw.

Stuart Smith

Alien species - the aquatic perspective

With a convoluted coastline and numerous inland waterways, Wales is particularly vulnerable to aquatic invasions. At one time the danger was from human attacks, but these days the non-natives are less obvious. Some, like Japanese knotweed, were 'invited' here, but have long since outstayed their welcome. Others have hitched rides on boats, or are responding to warmer climates. DAVE THORPE takes a look at some of the latest invaders.

Peter Wakely / Natural England

Himalayan balsam

Ever since people arrived in the land now called Britain they have modified their environment by hunting and growing crops. Various plants and animals, not previously native to these shores, have been brought in for agriculture and food production. These have had a profound impact on our way of life, our landscapes, the rural economy and biodiversity, perhaps none more so in Wales than the domestic sheep. Until the Victorian and more recent fashions for gardening, the number of introduced species was relatively small. Most of the dazzling array of garden plants available today stay happily within the garden, largely because they are not well suited to the conditions found in the British environment. Many of them are at the edge of, or outside, their natural climatic range, and will not survive without assistance.

But lately there are a growing number of species which, once introduced, persist naturally in the wild. Increased global travel, the popularity of the garden make-over, and a lack of adequate biosecurity have all resulted in the importation of animals, plants, fungi and microbes, some of which present problems either to native species or to man. Successful aliens, once established, often have adaptations to particular environments and lack co-evolved predators here that can hold them in check. Some can cause real problems, to developers and ecology alike: indeed some species (e.g. *rhododendron ponticum*) can blanket whole landscapes and replace whole ecosystems.

Riverside plants

Species such as Japanese knotweed, Himalayan balsam and giant hogweed have long been

established in many parts of Wales, and despite programmes of control and legislation (for two of the species) they are still spreading. Swansea was victim to some of the earliest introductions of Japanese knotweed as a garden plant and now has huge problems with its treatment and disposal. Discussion of the spread of this species alone - legislation, damage caused, treatment methods and the costs involved – would be enough for an article in Natur Cymru. There is some hope, however: CAB International are researching biological control (funded by DEFRA and the Environment Agency) for Japanese knotweed and will be applying for the release of a control organism in the next few years.

Arfon Hughes

Crassula helmsii at Fenn's Whixhall Mosses on the Welsh-English border

Alder and *Phytophora* disease

Riparian alders (*Ulnus glutinosa*), the dominant riverside trees, are dying across Wales, the victim of *Phytophora cambivora*, a fungal disease. The spores of this fungi are water-borne and few riparian alders are safe. Coppicing of diseased trees can prolong life, otherwise leaf discoloration and canopy thinning progress quickly, followed by death of the tree.

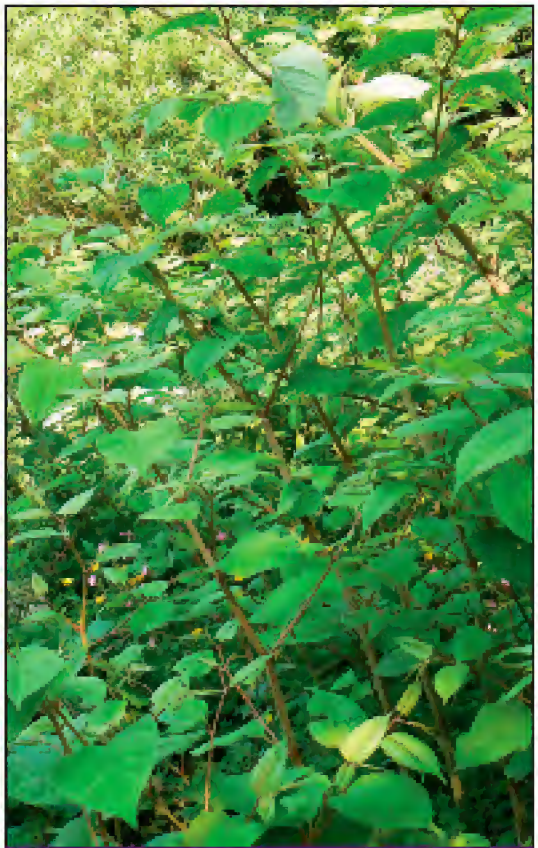
Paul Glendell / Natural England

Coppicing can prolong the life of diseased alders

Aquatic plants

Australian swamp stonecrop *Crassula helmsii* was introduced to Britain from Tasmania in 1911, and widely distributed by the pond / aquarium trade. Jonathan Newman at the Centre for Ecology and Hydrology (CEH) has been torturing the plant for years to try to identify its weaknesses. It can live in water and on land, is resistant to most herbicides, tolerates a wide range of pH, resists drought, has no dormant period, is eaten by no native fauna and has a unique metabolism that allows it to grow faster than native aquatic plants (Newman 2007). Control of this plant is a problem. Mechanical removal is

Mandy Marsh



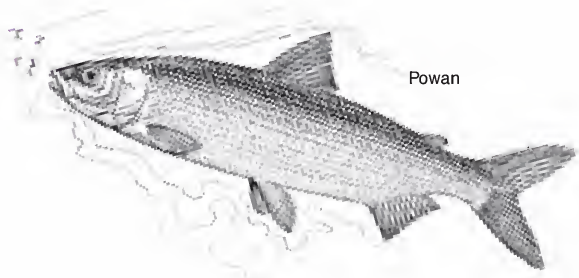
Japanese knotweed

near impossible – it is a brittle plant and any small fragments left behind will rapidly regenerate. A few herbicides are effective, notably diquat in water and glyphosate in the dry. But diquat has been banned for aquatic use, so the only control options for water are either to fill in the pond for two years, or to pump the pond dry and use glyphosate. Many trials using black plastic screens have been attempted at various English sites – all to little avail. The filling-in of ponds does seem to have worked. This is drastic action, but ponds are a variable habitat and their occupants are often well able to cope with drying or changing conditions (by long life or ready colonisation).

At Johnstown near Wrexham, a SAC designated for great crested newts, the North East Wales Wildlife Trust and Countryside Council for Wales have been working jointly to remove *Crassula*. The newts need areas of open shallow water for display and mating, and *Crassula* choking the ponds poses a real threat to their survival. The Johnstown ponds were pumped dry before being treated with glyphosate. This would have been best done in winter, when most newts are away from the ponds, but such management proved very difficult.

Crassula helmsii has been a major problem in Cumbria, invading a series of lakes including Windermere and Derwent Water, where it displaces rare native plant species such as *Luronium natans* and covers spawning sites for distinctive native fish (powan). In north Wales too it is spreading rapidly. Two sites have been found close to Llyn Tegid, one of which has been filled in. The other site is over a hectare in size and relatively deep, with aquatic and terrestrial growth of *Crassula*. The site is 6 km upstream of Llyn Tegid / Bala lake SSSI, SAC and Ramsar site. Llyn Tegid contains a range of species that are vulnerable to invasion by *Crassula* including *L. natans*, gwyniad (a herring-like glacial relic fish) and the only UK site for *Myxus glutinosa* (the small and rather unpleasant sounding glutinous snail).

Floating pennywort (*Hydrocotyle ranunculoides*), water fern (*Azolla filiculoides*), and parrot feather (*Myriophyllum aquaticum*), all largely distributed by the garden centre and pond trade, are also spreading. They are not as invasive as *Crassula* but can present real problems for pond and ditch management. Spread can be very rapid, particularly in the case of *Hydrocotyle*, where costs of management and damage to angling, navigation, flood risk management and ecology can be high (IACR).



Powan

Invertebrates

Various aquatic invertebrate species have recently been arriving and spreading in Wales. 2006 saw the detection of American signal crayfish *Pacifastacus leniusculus*, zebra mussels *Dreissena polymorpha*, and Chinese mitten crab *Eriocheir sinensis* in the catchment of the river Dee. American crayfish have been found at Llangollen and on a tributary of the Conwy. Although we have no records for native white-clawed crayfish, this American relative can still cause problems, by burrowing extensively, preying on fish, fish eggs and native invertebrates, and altering stream ecology.

Dave Thorpe

Chinese mitten crab

Dave Thorpe

American signal crayfish

Zebra mussels arrived on a fishery near Wrexham and have been found in Cardiff Bay. This small mussel can increase dramatically, building huge masses that smother stream, river and lake beds, and our own native mussels. Water clarity can improve, but the collapse in plankton populations has serious consequences for fish numbers. There are economic implications for the water industry too, as treatment plants become heavily infested with mussels. This species has caused severe problems in the American Great Lakes, in Northern Ireland and in England. The main vector is thought to have been boats.

Chinese mitten crabs have arrived in the Dee Estuary. A single specimen was found by one of the Environment Agency's Fisheries Officers in Autumn 2006, just before a report of over 1000 being landed in a dredge. The adults live in marine conditions, but the juveniles colonise fresh water, where they dig extensive burrows that can undermine bank stability and alter stream ecology.

Mammals

Mink *Mustela vison* have now arrived on Anglesey, an island that contains one of the National Key Sites for water voles (*Avicola terrestris*). Somewhat ironically, the first specimen was caught in a grey squirrel trap set by Menter Môn Officers in their attempt to rid the island of this other unwelcome alien mammal. Many studies have linked the presence of mink with localised water vole extinction (Strachan & Moorhouse 2006). Water voles lack effective methods for avoiding mink and can be preyed upon not just in the water but also within their burrows. Breeding female mink are particularly adept at hunting vole colonies to extinction. The Environment Agency is now in partnership with Menter Môn and the British Association for Shooting & Conservation (BASC), using the Game Conservancy mink raft in an attempt to eradicate mink on the island. The plan is to make the island mink-free then establish a *cordon sanitaire* on the mainland. As ever, extra money and long-term commitment is required.

Sadly this is not an exhaustive list of invasive alien species in Wales. As our climate becomes warmer and drier a wider range of garden and horticultural species is likely to jump the fence. Land managers and conservationists have two options. We could do nothing and learn to live with these species and their consequences. Or we could find resources to eradicate early invasions and spend the money required to research control methods. But funding and effort is decreasing. Our responsibilities under the Habitats Directive and the Water Framework Directive require us to keep our rivers and important wildlife sites alien-free,

but to accomplish this we need increased resources for control, and legislation to improve biosecurity.

Dave Thorpe *is a Biodiversity Technical Specialist at the Environment Agency, Wales.*

The Environment Agency gives advice on the control of aquatic and riparian plants and invasive riparian species, and licences use of herbicides adjacent to water. It is the Lead Partner for water vole and glutinous snail in the UK BAP, has a legal duty for conservation of fauna and flora, and is a Competent Authority in the Habitats Directive.

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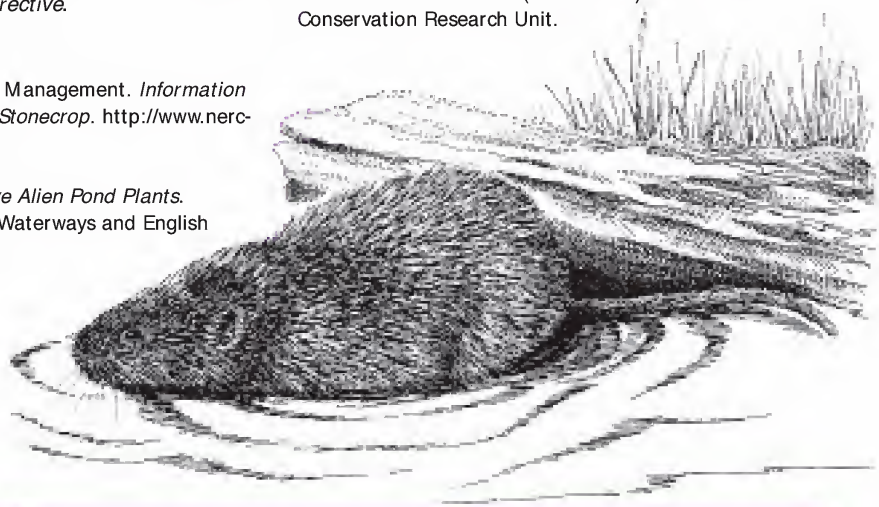


Water vole

Estroniaid ar gynnydd

Mae mwy o rywogaethau estron yn llwyddo i ymledu drwy Brydain, ar waetha'r ymdrechion taer i'w gwaredu. Mae planhigion dŵr estron fel corchwyn Seland Newydd a dail-ceiniog arnofiol, a werthwyd yn helaeth mewn canolfannau gerddi, yn effeithio ar fywyd gwyllt fel y gwyniad a llyriad-y-dŵr arnofiol a hefyd ar weithgareddau fel genweirio a mordwyo. Rhaid troi at ddulliau rheoli dramatig weithiau; bwriedir cyflwyno organeb byw i reoli clymog Siapan ac yn achos y corchwyn, rhaid llenwi pyllau am gyfnod neu eu sychu er mwyn gwenwyno'r llystyfiant gyda glyffosad - fel y gwnaed ger Wrecsam er mwyn achub cynefin fadfall ddŵr gribog. Mae ffyngau estron hefyd yn colbio ein coed. Lladdwyd cannoedd o lwyfenni Lloegr yn ystod y 70au a'r 80au. Erbyn hyn, mae coed gwern yn dioddef a ffwng arall wedi cyrraedd i fygwth coed deri.

Mae'r cimwch afon Americanaidd a chrancod Tsieineaidd wrthi'n brysur yn turio mewn i dorlannau afon, a misglod sebra yn gormesu gwelyau nentydd a llynnoedd. Ar Ynys Môn, un o gadarnleoedd llygod pengrwn y dŵr, mae cadwraethwyr wrthi'n gosod rafftiau i ddal y mincod sydd wedi llwyddo i groesi'r Fenai.

Bydd hon yn broblem gynyddol wrth i'r hinsawdd newid. Ai gwneud dim yw'r ateb, a dysgu byw gyda'r rhywogaethau hyn, neu geisio darganfod dulliau rheolaeth addas? Os ydym am gadw cynefinoedd pwysig yn rhydd rhag rhywogaethau estron bydd angen mwy o arian a gwell deddfwriaeth i sicrhau bioddiogelwch.

Grazing in woodlands

Wilson's filmy fern, *Hymenophyllum wilsonii*

Too much grazing in woods stops natural regeneration, so conservation management has encouraged the fencing out of livestock from wildlife-rich woodlands. But conservation prescriptions have a danger of being inflexible and adopting a blanket approach. Meticulous monitoring has shown that some grazing at the right time can be beneficial to woodland bryophytes without stopping young trees becoming established. ROD GRITTEN takes up the story.

Management of woodlands within agri-environment schemes in Wales, notably *Tir Cymen* and now *Tir Gofal,* is extremely prescriptive. If the woodland is grazed, then grazing should be removed. It is common in Snowdonia, and indeed throughout Wales, for our woodlands to exhibit signs of decades if not centuries of grazing. It is traditional for farmers to maintain some woodland cover for the winter grazing of their stock, particularly sheep. Woodlands provide protection from cold winter winds and stock grazed in them will need to expend less metabolic energy to keep warm. Stock over-wintered in woodlands lose less weight and condition. Summer grazing is also historically common even though the bulk of the stock may have been moved onto upland, mountain, pastures.

These woods have a striking ecological similarity. Very often trees are of a uniform age, there is no tree seedling regeneration and the ground flora is extremely impoverished. So-called 'scrub oak' woodlands often also have another attribute. They are bryophyte-rich. Many years of sheep grazing have reduced the ground flora abundance and diversity to such an extent that the woodland floor is often dominated by a carpet of bryophytes.

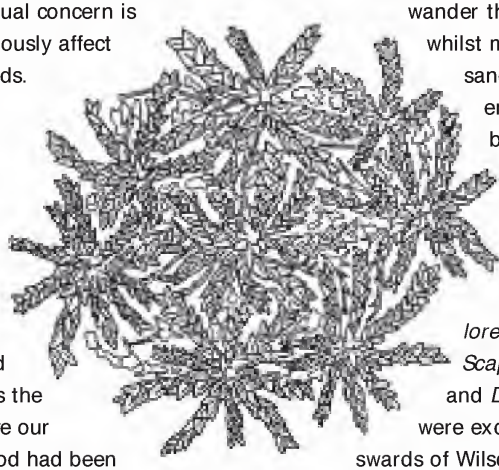
Ray Woods

Dicranodontium denudatum

Agri-environment scheme Field Officers may have a difficult decision on their hands when deciding how to manage these woods. Left as they are, they will end up dying. No seedling regeneration means no new trees and the priority must be to reverse this. Simply fencing out these woods to exclude stock, in the expectation that an understorey of tree seedlings will automatically develop, is fraught with difficulties. The dense shade of the existing canopy often inhibits the successful establishment of, particularly, oak saplings and so alternative strategies have to be considered. However, these issues are beyond the scope of this article. What should be of equal concern is that stock exclusion may seriously affect the biodiversity of these woods.

Let us look at a specific example. The Snowdonia National Park Authority started discussions about an agri-environment scheme with a farmer in Nant Gwynant near Beddgelert in 1993. An attractive oak wood overlooking Llyn Gwynant was the first part of the farm to receive our attention. It was clear the wood had been grazed for a very long time. The wood is dominated by sessile oak *Quercus petraea* with scattered rowan *Sorbus aucuparia*, Holly *Ilex aquifolium* and downy birch *Betula pubescens* – a typical Snowdonia upland oak woodland, fitting into the W17 type of the National Vegetation Classification (NVC). The ground flora did not look particularly exciting – scattered common bryophytes and wavy hair grass *Deschampsia flexuosa*. The nine hectare wood was fenced to exclude grazing stock, a transect established through the wood and a number of two metre square quadrats were laid down. The ground flora in each quadrat was identified and its abundance assessed using the Domin scale. We were interested in observing what happened to the ground flora and developing seedlings once grazing animals were removed.

Quadrat monitoring of vegetation, as every ecologist knows, is a painstaking business. So, as a bit of light relief from this hands-and-knees work, I had a wander through the rest of the wood whilst munching on a much needed sandwich. To my surprise, I discovered this wood was very rich in bryophytes and ferns, particularly on the steeper rocky areas. Common species were in abundance and the intricate carpet of species such as *Rhytidiadelphus loreus*, *Sphagnum quinquefarium*, *Scapania gracilis*, *Dicranum majus* and *Dicranodontium denudatum* were exquisitely beautiful. Dense swards of Wilson's filmy fern (*Hymenophyllum*



Sphagnum

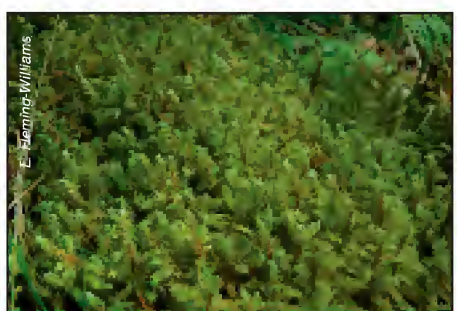
wilsonii) covered the rocks and, unusually, over a metre up the trunks of oak trees. The bryophyte assemblage was every bit as rich as Coed y Rhygen SSSI near Trawsfynydd, at a considerably higher altitude. This part of Nant Gwynant may only be 60 metres above sea level but it enjoys a disproportionately high rainfall and it is this that creates the humid conditions so loved by bryophytes. In fact, later woodland surveys by CCW resulted in the wood being designated as an SSSI, largely because of this bryophyte richness.

Rod Gritten

Young holly growth in ungrazed areas

But I noticed something else during my raptures over the mosses, liverworts and ferns. After only two months without grazing, the *Deschampsia* was rapidly growing through the bryophyte carpet and it was clear that the grass would soon swamp it. Several months later, bilberry *Vaccinium myrtillus* and scaly male fern *Dryopteris affinis* were behaving in the same way.

So how to both conserve the bryophyte and fern diversity, and allow seedling regeneration? Bear in mind too that at this time *Tir Cymen* had already fenced out over one thousand small woods in Meirionnydd alone. How many other bryophyte-rich woods were being threatened by the very management that was designed to save them? Indeed, with the proliferation of *Tir Gofal* schemes throughout Wales, there may be many thousands of threatened woods. Admittedly, not all of these woods are likely to be rich in lower plants, but in my experience many of them are so blessed. In my view, we have an international obligation to conserve this diversity in north Wales and the only way to reduce the competition from other ground flora must be through grazing.


E. Fleming-Williams

Rhytidiadelphus loreus

It is not easy to arrive at an appropriate grazing regime that allows the bryophytes to flourish while simultaneously encouraging seedling regeneration. Appropriate management must be found too that relies mainly on landowner's intervention rather than agri-environment scheme Field Officers who are hard-pressed and few in number.

So, with a Biodiversity Challenge grant from the Forestry Commission, the wood was fenced into four equal-sized compartments. Two compartments act as controls (though future grazing treatments may be tried out on one of these). One compartment has still to be subjected to an episodic grazing regime - once the seedlings are high enough, sheep can be introduced to see if heavy pulse grazing will

Ray Woods

Scapania gracilis

Rod Gritten

Mixed bryophytes on tree trunk

reduce competition from 'invading' bramble *Rubus fruticosus*, bilberry and grasses. And the fourth compartment is being subjected to annual grazing but strictly only in the winter months. The reasoning is simple: being essentially grazers rather than browsers, sheep do not recognise seedlings in winter as food, especially when there is an abundance of grasses and other more palatable species around. Sheep are introduced into the wood in late November to early December when all the tree seedlings have completely lost their leaves. Once there is no more 'bite' for the sheep, they are removed. Generally, at current grazing levels (about one sheep per hectare), sheep are in this compartment for about three months.

Clearly there is a great deal of science behind all this. Detailed quadrat analysis and vegetation height measurement is carried out every year or so. We were lucky to get an MSc student to repeat all this detailed monitoring, involving fortnightly visits throughout the winter grazing period to see how seedlings are coping with grazing, and subject the results to statistical analysis three years ago. The results are very encouraging. Seedling regeneration in the ungrazed compartments is good but bryophytes, as expected, are declining significantly. However, in the annual winter-grazed compartment, bryophytes are holding their own but happily the seedling regeneration is not significantly affected. The prescription seems to be working. But there are other interesting benefits to winter grazing. Bramble, which is often considered to slow down seedling establishment, is severely checked and, more significantly, holly is also greatly reduced. This is important as so many of our recently enclosed oak woodlands are becoming choked by dense holly, and other more desirable seedlings are being inhibited.

We need to carry out this experiment with adequate scientific rigour but, in my view, there need be no mystery about how to undertake such grazing management in the future. It doesn't really matter what size the wood is or exactly how many animals graze it, although light grazing is preferable to avoid damage to the bryophyte sward through enrichment. A good farmer will assess the health of his or her stock at least once a week. If the stock looks in good condition and there is still plenty for them to eat, they might as well stay where they are. If their condition deteriorates or there is no longer an adequate bite for them, then they should be

Rod Gritten

Brambles invade ungrazed areas on the left

removed to other grazing. The farmer or woodland manager doesn't have to get on their hands and knees to examine the tiny tree seedlings for signs of nibbling – that is being done at this experimental stage. A good farmer wouldn't leave stock where there is nothing for them to eat, so the seedlings aren't vulnerable. It's as simple as that.

This trial has been running since 1998 and it would be useful to continue it for several more years. However, I think it has been successful enough to date to be used in 'mainstream' agri-environment schemes throughout Wales where Field Officers are concerned that bryophyte diversity might be affected. I've noticed that recently enclosed mixed ash/oak woods with a wild garlic *Allium ursinum* understorey have been losing this ground flora, which is scarce in the more acidic parts of Wales, to rapid bramble encroachment. Perhaps winter sheep grazing might be beneficial to these woods too?

***Dr Rod Gritten** is Senior Ecologist at the Snowdonia National Park Authority.*

Pori coedwigoedd - amser i ailfeddwl?

Mae cynlluniau fel Tir Gofal yn argymell atal stoc rhag mynd i goedwigoedd. Pwrpas hyn yw rhoi cyfle i'r coed aildyfu. Ond mae llawer o goedwigoedd Cymru wedi cael eu pori ers canrifoedd, gan eu bod yn llecynnau cysgodol, yn enwedig yn y gaeaf.

Gall coedwigoedd sy'n cael eu pori fod yn unffurf iawn, o ran oedran y coed. Gall y ddaear hefyd fod yn drwch o fwsogl. Os bydd y pori'n parhau, bydd y coedwigoedd hyn yn diflannu yn y pen draw oherwydd nad oes coed ifanc yn tyfu. Ond gall diffyg pori effeithio ar y mwsogl hefyd. Nôl yn 1998, sefydlwyd arbrawf yn Nant Gwynant i astudio effeithiau gwahanol driniaethau ar ddarn o goetir. Gwelwyd bod coed yn aildyfu'n llwyddiannus, ond bod y mwsogl yn dioddef, ar ôl atal pori yn gyfan gwbl. Ond wrth bori'n ysgafn yn y gaeaf, mae modd annog tyfiant mwsogl heb effeithio ar aildyfiant y coed. Mae pori gaeaf hefyd yn helpu atal y mieri a'r celyn rhag tyfu'n drwch. Gallai'r patrwm pori hwn fod yn addas ar gyfer mathau eraill o goedwigoedd sydd wedi cael eu ffensio rhag stoc – fel coedydd ynn a garlleg gwyllt sy'n dechrau cael eu tagu gan fieri. Awgrymir, felly, y dylid ehangu'r arfer i rannau eraill o Gymru.

Biopix

The distribution of molannid caddisflies in Wales

Molanna albicans

The larvae of molannid caddisflies (Trichoptera: Molannidae) exhibit an unusual case construction. A dorsal lip and wing-like lateral extensions conceal the larva in its lake and slow-flowing river habitats. Here TONY JENKINS and IAN WALLACE describe the distribution of both British species in Wales, which show a generally clear-cut geographical separation.

Figure 1
Larval case - dorsal view

Figure 2
Larval case - ventral view

Figure 3
Larval case - transverse section

Life history

The case-bearing *Molannidae* caddisfly family is represented in Great Britain by two species, *Molanna angustata* Curtis and *M. albicans Zetterstedt*. Both are found in slow-flowing reaches of rivers as well as still water habitats. The larval stages are generally restricted to a substratum of gravel and fine sand, and as such they may be scarce or absent from the more exposed littoral. Larvae construct an unusual and distinctive case of sand grains in which the head and thorax are concealed beneath the dorsal cover (Fig. 1). Cases are well camouflaged with a central tube beneath the convex shield-shaped dorsal lip. (Fig.2). This dorsal part of the larval case extends forward as a hood over the opening in the central tube, and also forms wing-like lateral extensions on either side of the tube (Fig. 3).

Young larvae are found in April, while mature specimens are present during May and June. The adult flight period of *M. albicans* is short (June-July) whereas that of *M. angustata* has an extended period from May through August.

Distribution

M. albicans is confined to small upland lakes in Wales (1,2). Elsewhere in Great Britain it is known from lakes in central and northern Scotland, together with lakes and slow-flowing rivers in central Ireland (3). It is surprisingly absent from the English Lake District, where there are many suitable upland lakes. This is all the more puzzling as it was recorded from nearby Birkdale Tarn in north Yorkshire in 2004 by Bob Merritt. *M. angustata* is the species of lowland lakes such as Blelham, Esthwaite and Windermere. It is a relatively common species in England north to Cumbria and Yorkshire, where it occurs in lakes, canals and slow-flowing rivers (3), and would be generally regarded as a lowland species.

Within Wales it was recorded from Llangorse Lake in 1928 (4), another lowland lake, Hanmer Mere, in 1978 during a Nature Conservancy Council survey, and from the River Wye at Redbrook in 1997 by the Environment Agency. *M. angustata* has been recorded from Tregaron Bog (5) although this may well be a misidentification of *M. albicans*, the females of which present particular difficulties in separation from those of *M. angustata* (Dr. P.C. Barnard, pers. com.). One of us (IW) has found a few adults of *M. albicans* masquerading as *M. angustata* in museum collections.

More recently, *M. angustata* was collected from a reservoir near central Cardiff in 2003 (A. Fowles, *pers. com.*) which TJ confirmed from larvae kindly loaned by the National Museum of Wales. The following year, during a survey of lakes and ponds in the area administered by Blaenau Gwent County Borough Council, two further *M. angustata* sites were discovered. Larvae of this species were collected from St. James Reservoir at Tredegar as well as the smallest and most eastern of the three lakes at Waun-y-Pound near Ebbw Vale (6).

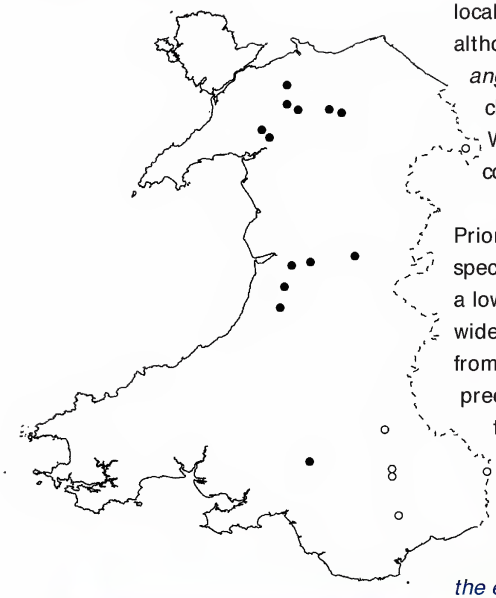
Conservation significance

M. albicans has a distinctly upland distribution in Wales and is found in small lakes. Most suitable

Llangorse lake

Jeremy Moore/CCW

● *Molanna albicans*
○ *Molanna angustata*



localities are in the north, west and central parts of the principality, although it should be sought throughout. On the other hand, *M. angustata* has a noticeably eastward range. The Environment Agency classifies *M. angustata* as a Regionally Notable Species within Wales, and therefore the six known sites are important within the context of Local Biodiversity Action Plans.

Prior to the discovery of *M. angustata* in Blaenau Gwent, the two species seemed to be clearly separated into an upland *M. albicans* and a lowland *M. angustata*. However, the latter species is obviously more widespread, and would be the most likely of the two species to benefit from climatic warming. As this occurs, extant populations of the predominantly northern *M. albicans* will assume increasing conservation importance.

***Tony Jenkins** is a consultant hydrobiologist and **Ian Wallace** is Curator of Conchology & Aquatic Biology at the National Museums Liverpool. Both authors have a longstanding interest in the ecology of caddisflies.*

Pryfed molanid yn ymateb i newid hinsawdd

Mae larfâu pryfed gwellt Molanid yn creu casyn nodweddiadol o'u cwmpas gan ddefnyddio gronynnau tywod. Mae dwy rywogaeth yn bresennol ym Mhrydain. Yma, yng Nghymru, cyfyngir *Molanna albicans* i lynnoedd bychain yn yr ucheldir. Creadur yr iseldir yw *M.angustata*. Cofnodwyd ef o lynnoedd ac afonydd araf fel Llyn Syfaddan a'r Afon Gwy, ac o gronfeydd yn ardal Caerdydd, Glyn Ebwy a Thredegar.

Mae *M.angustata* yn fwy eang ei ddosbarthiad ac mae'n debyg mai hwn fydd yn elwa fwyaf o ganlyniad i gynhesu byd eang. Wrth i hyn ddigwydd, cynyddu wnaiff pwysigrwydd cadwraethol y poblogaethau gogleddol o *M.albicans*.

Acknowledgements

We are indebted to Blaenau Gwent CBC for permission to include the Tredegar and Ebbw Vale records. Thanks are also due to Dr. Mike Wilson (NMW) for providing the Cardiff specimens and also Adrian Fowles (Countryside Council for Wales) for originally drawing our attention to the Redbrook and Cardiff locations. Finally, we are grateful to Richard Pryce for production of the distribution map.

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NATUR • Managing nature

Yn rhifynnau cynnar y cylchgrawn yma, roedd adroddiadau gan staff gwarchodfeydd yn sôn am arferion rheoli tir yn cael eu cynnwys yn eithaf rheolaidd. Does dim byd a all guro adroddiad o lygad y ffynnon am hynt a helynt rheoli gwarchodfa er mwyn cyfleu beth yw natur y safle a'r sialensiau y mae'n rhaid i staff cadwraeth eu goresgyn.

Bellach, mae'r adroddiadau rheolaidd yma wedi cael eu disodli gan erthyglau hwy'n canolbwyntio ar safleoedd, ond y bwriad yw eu hailgyflwyno a'u hymestyn yn y dyfodol. Yn rhannol, mae hyn wedi deillio o lwyddiant Cynhadledd Cadwraeth Cymru, sydd wedi aildanio diddordeb ym maes rheolaeth cefn gwlad yma yng Nghymru.

Eleni, cafodd y gynhadledd ei chynnal yn Aberhonddu er mwyn cyd-ddigwydd â lansio dathliadau hanner canmlwyddiant Parc Cenedlaethol Bannau Brycheiniog. Y thema oedd 'gwerthoedd natur', ac roedd cryfderau'r gwerthoedd hynny'n gwbl amlwg ym mhob cyflwyniad, bron – hynny a chadwraeth, wrth gwrs. Trevor Fishlock oedd un o'r siaradwyr, a rhoddodd esboniad clir i ni o'r ffordd y gall mynyddoedd effeithio ar ein hysbryd. Siaradodd Derek Gow am werth afancod o safbwynt gwarchod gwlyptiroedd, ac ef a ddenodd sylw'r wasg yn bennaf. Dangosodd Tom Burditt fod gwybodaeth am eich ardal leol yn bwysicach o lawer wrth reoli safleoedd na fformiwlâu gwyddonol parod; a siaradodd Dr Stephan Harding, gŵr sy'n cydweithio'n agos gyda James Lovelock, am ecoleg a pha mor bwysig yw gwarchod bioamrywiaeth mewn hinsawdd newidiol. Ar ôl cinio, cafwyd hanes hynod ddiddorol gan Horatio Clare yn sôn am ei fagwraeth ar fferm ar Fannau Brycheiniog – byd dedwydd dros ben.

Braf iawn yw cael ein hatgoffa o'r pethau sy'n gwneud Cymru'n lle mor arbennig. Rwy'n siŵr fod y rheini a fu'n ddigon lwcus o fynd i'r gynhadledd wedi gadael gydag ymrwymiad o'r newydd. A fydd hyn yn ddigon i'w galluogi i oresgyn yr anawsterau – diffyg adnoddau, syrthni sefydliadol ac ati – sy'n rhan annatod o wireddu unrhyw freuddwyd gwerth chweil?

Er mwyn cynnig cefnogaeth barhaus, ac er mwyn sicrhau y bydd y Gynhadledd flynyddol yn mynd o nerth i nerth, mae partneriaeth o'r enw NATUR wedi ei sefydlu. Edrychwn ymlaen at weithio gyda'r corff newydd, a byddwn yn rhoi mwy o'i hanes i chi yn y dyfodol.

Reports about land management practices by reserve staff were a regular feature of early editions of this magazine. There is nothing like a first hand account of the trials of managing a reserve to convey the nature of a site and the challenges which conservation staff have to overcome.

This regular feature has faded in favour of longer articles about sites, but the intention is to bring it back and extend it in future. This is in part inspired by the success of the annual Wales Conservation Conference, which has brought a new vigour to the countryside management profession here in Wales.

This year's conference was held in Brecon, to coincide with the launch of the Brecon Beacons National Park's 50th anniversary celebrations. Its theme was 'values in nature', and the strength of those values was apparent in almost every presentation – and conversation. Among many speakers, Trevor Fishlock gave a wonderfully crafted exposition of what mountains do for the spirit; Derek Gow spoke about the value of beavers to wetland nature conservation, and attracted most of the press interest; Tom Burditt showed that local knowledge was more important than off-the-shelf scientific formulae when managing sites; and author Dr Stephan Harding, a close associate of James Lovelock, talked about deep ecology and the value of biodiversity conservation in a changing climate. After dinner Horatio Clare gave a riveting account of an upbringing amidst nature on a farm in the Brecon Beacons – pure poetry.

It is good to be reminded of those things which make Wales special, and at which we excel. Those lucky enough to attend the conference will have left with a feeling of renewed commitment. Will this be enough for them to overcome the difficulties - lack of resources, institutional inertia and so on - which are a feature of getting anything worthwhile done?

To provide continuing support, and to ensure that the annual Conference continues to run, a partnership has been established, called NATUR. We look forward to working with the new organisation, and will report on this in future editions.

James Robertson

Cymru a'r byd

Guten Tag o'r Hotel Aumüller yn Rüdesheim wrth ymyl afon fendigedig y Rhine. Rwyf wedi bod yma'r wythnos hon efo fy nghôr yn canu Gwahoddiad i'r Almaenwyr. Gyda brecwast bellach wedi dod i ben, rhaid imi droi fy ngolygon at drafferthion Bae Caerdydd gannoedd o filltiroedd i ffwrdd.

A lwyddwyd i daro bargen? Dair wythnos ar ôl yr etholiad, ar ôl ffurfio a chwalu nifer o ddarpar glymbleidiau, mae Rhodri Morgan bellach wedi ei gadarnhau unwaith yn rhagor fel Prif Weinidog y Cynulliad ac fel arweinydd Plaid Lafur leiafrifol.

Fe fydd llawer ohonom yn cofio'r adeg pan oedd etholiadau'n llwyddo i roi trefn ar bopeth. Yn amlach na pheidio, fe fyddai'r etholwyr yn bwrw'u pleidlais a byddai llywodraethau'n cael eu hachub neu eu chwalu dros nos. Roedd pethau'n gwbl glir, er nad wrth fodd pawb, efallai. Mae'r newid a'r ailwampio sydyn a ddaw i ran ein llywodraethau yn rhyfeddu ein partneriaid ar y cyfandir yn aml, gan eu bod wedi arfer efo traddodiad hir o glymbleidiau a tharo bargeinion y tu ôl i'r llenni.

Ond hyd yn oed wrth i Rhodri Morgan ailafael yn ei swydd yn Adeiladau'r Goron, go brin fod modd cau pen y mwdwl gwleidyddol. Mae pedair blynedd yn amser go faith i lywodraethu a chithau bedair sedd yn brin o gael mwyafrif, ac mae yna sïon ar led fod yna gytundeb rhwng y gwrthbleidiau yn yr arfaeth.

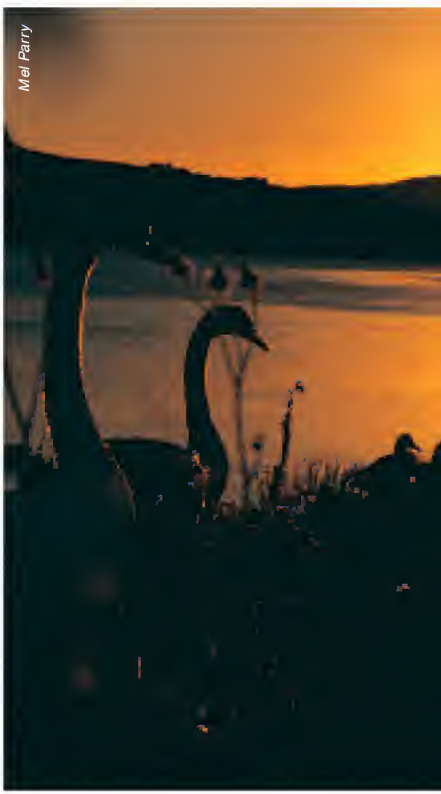
Er hynny, dyma gyfnod hanesyddol: amser i ni edrych yn llawn gobaith tua'r dyfodol. Croeso i'r Gymru newydd! I Gymru a chanddi bwerau a chyfleoedd newydd sbon danlli. Yn awr, fe allwn wneud mwy o benderfyniadau ynghylch materion domestig nag erioed o'r blaen. Bellach, mae gennym yr awdurdod i newid y fframwaith cyfreithiol sy'n sail i'n gwasanaethau cyhoeddus a'n blaenoriaethau fel cenedl.

Wrth gwrs, mae newid gwleidyddol yn pryderu'r sector amgylcheddol bob amser. Pa mor bwysig fydd ein blaenoriaethau yn llygad y Cynulliad newydd a'i lywodraeth? Ond yn sgil llywodraeth leiafrifol, o leiaf fe all nifer o grwpiau yng Nghymru fanteisio ar y cyfle i wyntyllu eu syniadau a chyflawni mentrau newydd.

Fe fydd yn rhaid i ni weithio gyda phob plaid er mwyn pwysleisio'r angen gwirioneddol i roi'r Strategaeth Amgylcheddol ar waith a rhoi cynigion newydd a beiddgar gerbron. Ac fe fydd yn rhaid i ni geisio sicrhau cefnogaeth y cyhoedd er mwyn cynnal y momentwm a sicrhau y cawn ni fesurau i ddiogelu a gwarchod ein hamgylchedd naturiol a hanesyddol.

Pwy a ŵyr am ba hyd y bydd y Llywodraeth leiafrifol yn para? Os caiff ei threchu, a oes yna ddewisiadau eraill a all fod wrth fodd y pleidiau gwleidyddol – ac, yn bwysicach fyth, wrth fodd trigolion Cymru? Er gwaethaf yr holl feirniadu sydd wedi bod ar y Blaid Lafur yn ystod yr wyth mlynedd y bu hi wrth y llyw, dydy'r Meistri Bourne, Jones a German ddim wedi llwyddo i gynnig ateb arall. A all gwrthbleidiau sydd wedi cael tair wythnos – ac yn wir, misoedd lawer – i lunio dewis ymarferol arall greu clymblaid amryliw? Yn wyneb y cwestiwn hwn, yr ateb ar hyn o bryd yw 'Na!'.

***Geraint Hopkins** yw Cadeirydd Cyswllt Amgylchedd Cymru. Hefyd, mae'n Gynghorydd Bwrdeistref Sirol ar gyfer Llanharan ac yn Gadeirydd Cyngor Cymuned Llanharan.*


Mel Parry

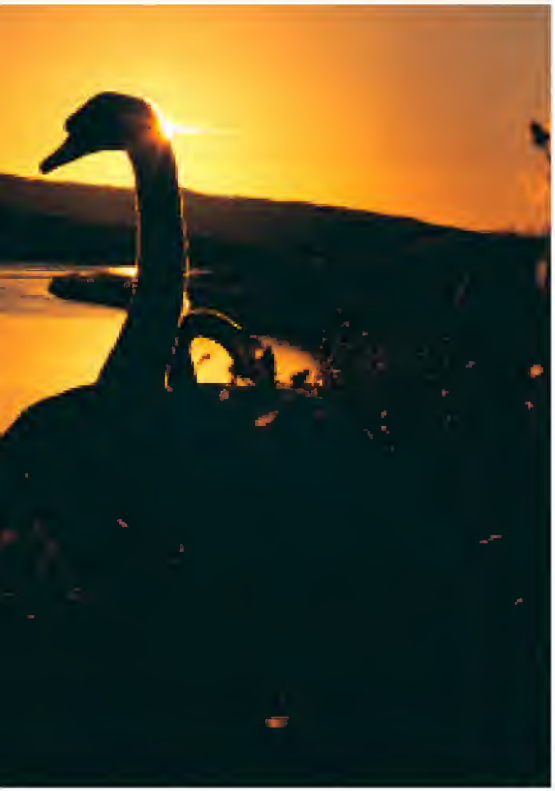
Wales and the world

Guten Tag from the Hotel Aumüller in Rüdesheim on the delightful Rhine. I've been here this week with my choir singing Gwahoddiad to the Germans. Breakfast over, and I must turn my attention hundreds of miles away to the tribulations of Cardiff Bay.

Deal or No Deal? Three weeks after the election, and after many starts and restarts to coalition partnerships, Rhodri Morgan has been reinstalled as First Minister leading a minority Labour Government.

Many of us will remember the time when elections settled things. More often than not, the electorate would speak and governments would be saved or toppled overnight. Things were clear, if not entirely welcome. The speed at which administrations changed often surprised our continental partners with their long tradition of coalitions and power-broking behind the scenes.

But even as Rhodri Morgan re-enters his office at Crown Buildings, I can't help thinking the political scene is far from settled. Four years is a long time to govern when you are four seats short of a majority, and there remain rumours and counter-rumours of an opposition pact.



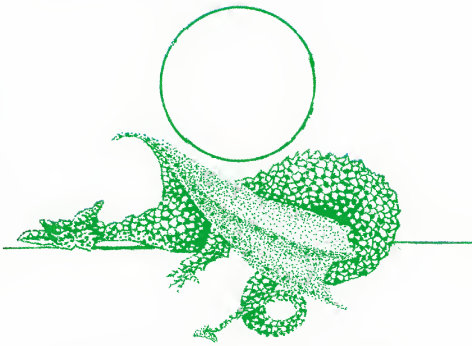
Nevertheless, this is an historic time: a time to be positive. Welcome to the new Wales! To a Wales with new powers and new opportunities. More decisions can be taken here about our domestic policy than ever before. We now have the power to change quite remarkably the legal framework in which public services and national priorities are delivered.

The environment sector is naturally concerned at political developments. Where will our priorities now sit in the new Assembly and its government? A hung Assembly does afford the many interest groups in Wales the chance to get their ideas aired and new initiatives delivered.

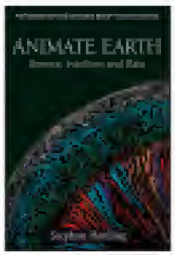
We'll need to work with all parties to try to hammer home the urgent need to deliver the Environment Strategy and put new, bold proposals forward for the environment in Wales. And we'll need to keep public opinion and support on board to maintain vital pressure in the country for measures to safeguard and protect our natural and historic environment.

Who knows how long the minority Government will hold out? If it is defeated, is there yet any viable alternative palatable to the political parties - and, very importantly, to the people of Wales? For all the critique of Labour's eight years in power, Messieurs Bourne, Jones and German have failed to provide an answer. Can opposition parties who have had three weeks - and let's face it, several months - to put in place an alternative, devise a rainbow alliance? Faced with the question, the answer right now is "No Deal!"

***Geraint Hopkins** is Chair of Wales Environment Link. He is also a County Borough Councillor for Llanharan, and Chairman, Llanharan Community Council.*



Green **Bookshelf**



THE REVENGE OF GAIA
James Lovelock
Penguin Books 2007
£8.99 paperback

ANIMATE EARTH
Stephan Harding
Green Books 2006
£10.95 paperback

A scientist to his fingertips, Lovelock has an impressive CV which includes working for NASA on their lunar and planetary science programmes, where he invented the electron capture detector which showed how prevalent DDT had become in the food chain, and in medical research and instrumentation, coming up with the means to measure CFCs which resulted in an unsung environmental success story – saving the ozone layer. Nevertheless, he has run the gauntlet of the scientific establishment because of his attachment to the concept of Gaia – the living, self-regulating planet. Even more, it is the name of the Greek Goddess of the Earth, suggested to Lovelock by the novelist William Golding, which has excited the disapproval of prominent scientists. For the concept is now universally acknowledged in science - that animate and inanimate life interact, operating rather like a single organism to regulate the planet.

Lovelock shows little affection for the further, woollier reaches of the environmental movement which embraced the term, but he has stuck with it because of his belief in the power of metaphor to communicate ideas, and this is what he wants to do. He has succeeded in this gripping and sobering account of the likely consequences of rapacious human environmental exploitation. It is much too late, he argues, for sustainable development – we need to negotiate a sustainable retreat. The issues we face are not simply those of carbon dioxide pollution; arable agriculture, for example, and the general loss of vegetation cover are equally a threat.

Not only will you learn things you did not know from this latest Gaian outing, but your whole perspective is likely to change. Lovelock is the nearest we have to a planetary doctor. His diagnoses and remedies have little time for the preoccupations of small-scale conservation. We need to focus, he suggests, not on the rare tree or bird or mammal, but on the whole forest. Its message may be gloomy, but Lovelock is a skilled storyteller, so his book is a remarkably stimulating read, with a profound scientific understanding of the biosphere at its heart.

By contrast, although Stephan Harding is a scientist, and **Animate Earth** is rich in scientific explanations for how our planet functions, it breaks new ground in its exploration of other ways of 'knowing', and other approaches to understanding. Harding is a teacher and researcher at the Schumacher College, and a close friend of James Lovelock, whom he describes as his mentor. He begins the book with a quote from Eric Fromm: 'Reason flows from the blending of rational thought and feeling.' His ambition is to find a language for the living, breathing biosphere which engages our feelings and empathy, just as the term Gaia has done, for some at least.

Harding gave an impassioned and well received presentation at a recent conference on values in conservation, which goes to show that, while science may convince the head that we should act, our intuition is necessary to engage the heart, and lead us into a deeper emotional identification with the living planet.

At times lyrical and poetic, this book is a devotion to Gaia, and an exhortation to the reader to respond emotionally as well as intellectually to the cause of saving Gaia. It may not attract many readers who are not already 'converted'; people often shy away from anything that can be construed, however faintly, as a voyage into touchy-feely new-ageism. This is a shame, as the ambition of this book is commendable, and I applaud anything which blurs the artificial lines which we construct between the diverse ways of understanding the world, such as fact and fiction, science and art. These labels should not be accepted uncritically; the author who writes a novel may feel able to be much more truthful about himself or herself in fiction than in autobiography!

Here are two substantial and stimulating books, which ultimately are satisfying rather than pessimistic. Lovelock describes Animate Earth as 'a wonderful and

beautiful book', but his own Revenge has been riding high in the best sellers as much for the panache with which he makes his case as for the timeliness of its message.
James Robertson

THE MAN WHO WENT INTO THE WEST: the Life of RS Thomas
Byron Rogers
Aurum Press
2006, Hardback
£16.99

This is a very readable biography of the poet, priest and naturalist, a man full of contradictions. Byron Rogers has spoken at length to many people who knew RS, and the book has many entertaining stories about their memories of, and dealings with, him. I was on Bardsey one October thirty years ago when he also was at the Observatory: a man of few words, he had brought a bag of onions and lived on onion soup.

In one interview, he said that he took up birdwatching in reaction against the encroachments of man and machine; elsewhere he claimed it was an escape from his parishioners! The Observatory on Bardsey opened in 1953 and RS went there with Elsie and their son Gwydion. On the way over they had to bail, and on the return the boat was nearly engulfed by huge waves. When RS showed concern, the boatman (Wil Evans presumably) spat and said "It'll get worse soon."

His life crossed several times with Bill and Penny Condry, on Enlli and at Eglwys Fach, where he was vicar before moving to Aberdaron. In 1966 he and Bill went on a month's birdwatching trip to Spain, an overseas trip required under the terms of a literary prize. Byron describes how they were arrested in France while watching a Montagu's harrier beside an air base, and were interrogated for a day. Bill claimed he never laughed so much in his life as during that month. A far cry from the austere, even humourless picture painted in the obituaries.
Geoff Gibbs

OFFA'S DYKE: A journey in word and pictures

Jim Saunders
Gomer Press
2006 £19.99

After spending 18 years as an Offa's Dyke Officer, it would be easy to forgive Jim Saunders for having a rather jaded view of this 110 mile feature that stretches from Chepstow to Prestatyn. All credit to him, therefore, for managing to convey a sense of real passion, not passé, between the covers of this book.

It is an easy, enjoyable read. The style is light and the writing is characterised by touches of humour and personality. It manages to create the feeling, in the reader's mind, of being led on a virtual guided walk by an enthusiastic local.

The book includes a mixture of history, archaeology, wildlife, pen portraits and personal stories. The format and layout is varied – and the juxtaposition of main text with 'scrap book' style pages to carry snippets of historical and wildlife information is particularly effective. Image-laden timelines have been produced for different sections of the Dyke. The selection of historical events was clearly a very personal one – from the Red Book of Hergest to the building of Powis Castle, the establishment of the Hay Festival and the appointment of an Offa's Dyke Archaeologist!

The superb images throughout the book reflect the author's passion for photography. The collection manages to convey the special and diverse quality of the border country landscape. The book was written to accompany a recent television series on Offa's Dyke. This may account in part for the lively, bouncing and snippety style of presentation. Although the Dyke itself is clearly the common thread, it appears that the author was given free rein to choose pretty much anything he wanted to write about and illustrate. What a treat!

This kind of 'pick and mix' is easily digested in one sitting, but with enough content to draw you back time and time again. Personally, I would have enjoyed hearing more about the author's work as the Offa's Dyke Officer - the issues that he faced in managing the Dyke and the changes he witnessed during his 18 years. Material for another series and another book, perhaps. This volume, as it stands, does an excellent job of whetting the reader's appetite for border country travelling and for venturing outdoors with a camera and a keen eye.

Elinor Gwynn

Islands Round-up

PEMBROKESHIRE 2006

SKOKHOLM

Island Warden Jo Havard reports as follows:

"On the 7th of April the island changed ownership for the first time in 350 years as the Wildlife Trust bought it after many months of fundraising. Nearly 1500 individuals and organisations donated to the appeal, and deserve a huge thank you for all their contributions. On the island we celebrated with a special delivery bottle of champagne and painted the Trust's Badger logo at the landing (luckily before consuming the champagne!). Also thanks to the appeal, the Trust was able to purchase a replacement Dumper truck to carry supplies and luggage up the steep track from the boat landing.

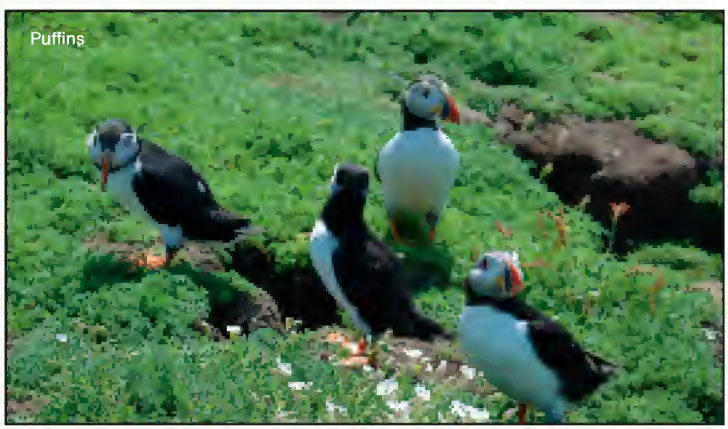
May was a very wet and windy month everywhere and on Skokholm it was particularly so. In a few of the dampest areas the shearwater burrows became waterlogged and then flooded, causing the bedraggled occupants to come out during the day.

A film student visited during May and fitted small infra red cameras in three puffin burrows, hoping to get footage of the birds below ground. One of these got great footage of an egg being incubated and then later a tiny chick being fed by one of the adults. Unfortunately the happy family than took umbrage at the intrusion and kicked the camera out of their burrow!

Wildlife highlights included two Cory's shearwaters on July 9th; two buff-breasted sandpipers (vagrants from N America) on 6th September; common porpoises in good numbers on the 7th, 8th and 9th; and a leatherback turtle on the 9th and 12th.

The remains of what was Hurricane Georgia hit the island on the evening of the 21st September. After nearly a week of strong south-easterly winds there was already a high swell running and the effect was quite powerful, waves crashing as high as the cliffs in South Haven and wind ripping the leaves from the bushes. The buildings, having stood the test of time and tempest many times before, came through unscathed. The optimistically planted vegetable garden, however, fared less well."

Emily Dicks



Puffins

SKOMER

The building work here continues apace, and is due to be completed this year.

On the bird front, warden Juan Brown reports that spring 2006 was disappointing, with poor numbers of returning migrants and a distinct lack of dazzling rarities. The highlights in May were a flock of at least three golden orioles, which commuted between patches of willow in North Valley in the second half of the month, plus a drake garganey and a firecrest. Notable breeders included tufted ducks – two pairs at North Pond attempting for the second successive year (seven chicks providing live food for hungry gulls) – and a pair of song thrushes, producing two broods near the Well. This is only an occasional breeder on Skomer.

Cetaceans included 30 common dolphins in St Bride's Bay on 14th July. These had increased tenfold by the next day, and on 8th September Juan was delighted to see four Risso's dolphins giving a good display north of Martin's Haven, the first since his arrival in 1999. After a good August, with up to five wrynecks present, autumn did not score highly on the migrant front, with visible migration in October and November disappointing. The exception was on 14th October, when a moderate east-south-easterly breeze delivered an exciting, if at times frustrating, day's birding. Juan's account is worth

Emily Dicks
Skomer

producing verbatim:
"It started with the rasping shreep of a Richard's pipit flying over as I waved a couple of (ironically keen birding) friends off on the *Dale Princess* mid-morning. Scanning the skies I just could not pick up this long-tailed, tubby Asian pipit, as its cry became fainter and finally disappeared. It was enough, though, to warrant a diversion through South Valley, and I was immediately rewarded with a long-eared owl, a species which had so far eluded me on the island. Newly-arrived hen harrier and woodcock kept up the interest, before an afternoon visit to North Valley Bottom revealed an obliging first-winter red-breasted flycatcher, cocking its tail from willow perches. A stomp out west was definitely on the cards, and it was there that the potential icing on the cake was to be found. As I made my way through bramble and rushes between West Pond and Bull Hole, three buntings flew up. The first two were reed buntings, but the third was a fraction of the size, considerably slimmer, and was persistently ticking like a robin! A little bunting! Another two reed buntings joined the flock, and all five flew off high towards the middle of the island, apparently going down near North Pond. It was undoubtedly bird of the day, but full plumage details were desirable, as was the ability to share the find with my colleagues. Sadly, a thorough investigation of North Pond in failing light produced nothing more than a jack snipe skulking in the margins."

Visiting Skokholm & Skomer: see **www.welshwildlife.org** or phone **01656 724100**

RAMSEY

Wardens Greg and Lisa Morgan report that this RSPB reserve also suffered Force 10 winds in mid-September, right in the peak pupping season for grey seals. Luckily the wind was from the south-east, and the largest rookeries on the west coast were not exposed to the worst waves. Storms in November reached violent storm force 11, with wind speeds over 100 mph!

In addition to birds and mammals, Greg and Lisa regularly run a moth trap. In 2006 they added 27 new species to bring the island list to 227. The four species of national interest on Ramsey were all recorded in 2006, these being dew moth, Barrett's marbled coronet, Devonshire wainscot and black-banded moth.

Keeping the island's turf short is important for the resident choughs. When the rabbit population was decimated last autumn by a myxomatosis outbreak, more Welsh mountain sheep were brought over to keep on top of the tall grass which was developing. The island's wheatears (90 pairs, the densest breeding population in Wales) also benefit from keeping the turf short. Many use the dry-stone walls for nesting.

Greg and Lisa visited Grassholm (also an RSPB reserve) in June and July, to help with research on foraging journeys made by the breeding gannets. Elinor Gwynn reported on the findings of this project in the last *Natur Cymru* (No. 22).

Visiting Ramsey: for volunteering see **www.rspb.org.uk**, and for day trips phone Thousand Island Expeditions (**01437 721721**).

Stop-press from north Wales: Tenant farmer David Barnden and his wife Libby have left Bardsey and have resettled on Muck (the small island next to Rhum and Eigg). Bardsey Island Trust are presently making arrangements for the continued grazing of the island.

Collated by Geoff Gibbs

MAMMAL NEWS
from North Wales Wildlife Trust

Red squirrels
A new population of red squirrels has been found living in north Wales.

Following reports of sightings in Cynwyd Forest in the Upper Dee valley, staff and volunteers from the Denbighshire Countryside Service set out to discover if the reports were true. They used baited hair-tubes to collect hairs - hairs from animals passing through the tubes are caught on sticky inserts - which are then identified under a microscope. Dr Sarah Cartmel, who wrote about red squirrels in the very first issue of *Natur Cymru*, has found that some of the hairs collected have come from red squirrels, confirming their presence within the forest.

This new discovery shows that our Welsh red squirrels can manage to cling on in some locations despite the invasion of greys. It gives us hope that with the right management we can maintain the presence of red squirrel in Wales, and maybe even increase their numbers in the future (see Isabel Macho's article, p16).

Otter holts
NWWT most recently built new otter holts at our Coed y Felin and Y Ddol Uchaf nature reserves in Flintshire, and we will be monitoring them for signs of use in the years to come. A reminder of how vulnerable otters are came with the discovery of dead otter killed by a vehicle on an Anglesey road. Tragically, the animal was a lactating female.

Long-distance horseshoes
The discovery of more endangered greater horseshoe bats during hibernation surveys this winter, by the Gwynedd Bat Group in north Wales, is exciting. The first north Wales greater horseshoe bat, found by Jean Matthews in 2001 and now nicknamed 'Dean', was born 110 miles away at Dean Hall in the Forest of Dean, Gloucestershire, in June 1999, and was ringed by David Priddis as part of his 21 year study of this breeding site.

This year Jean found a ringed female on 20th January in a disused mine on a Woodland Trust Reserve in the Conwy valley. This bat was also born at Dean Hall, near Cinderford, and was ringed by David shortly after her birth in July 2006. 'Cinders' (as she has been named) was found in a mine adit adjacent to the one where 'Dean' was found on the same date. The bats that are now in the Conwy Valley are believed to be the furthest north this mainly Mediterranean species has ever been discovered.

Three records of unringed greater horseshoe bats, including a male, found by Pauline Barber in March this year, are all within 35 miles of the Conwy bats.

These long distance movements are unusual but probably vital to ensure gene interchange in a species where females normally return to their birth roost to breed. The recent finds also give rise to the exciting possibility of a new colony starting in north Wales, especially if future winters remain as mild as those of recent years.

Dormice have a good year!
Dormice did well last year and, thanks to the North West Dormouse Partnership, we have the proof. In order to find out about the population at Bontuchel, a very good dormouse wood near Ruthin, we started 'chipping' dormice under licence in 2005, attaching tiny 8mm micro-chips to identify each individual which is caught. Numbers were much

Dormouse
CCW

Help bridge the gap with 'Fens Reunited'

An Appeal from the North Wales Wildlife Trust to help improve connectivity between two of Anglesey's premier wetland sites.

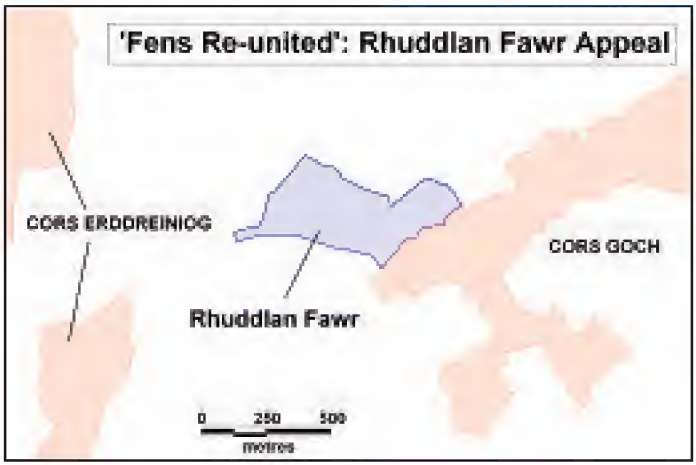
Cors Goch and Cors Erddreiniog hold a special place in the series of Welsh wetlands enjoying maximum protection as National Nature Reserves. They are both base-rich fens; a habitat unique in Wales to Anglesey. It also happens that the distance between the two reserves is less than two kilometres. It has long been the dream of local ecologists that the two should link up in some way; that the intervening land should provide a better functional link between them.

Just such an opportunity is on offer right now. The North Wales Wildlife Trust has first refusal on 42 acres of farmland that would halve the distance between the two reserves. This is a golden opportunity to acquire land that would help wildlife and also improve access to Cors Goch. It would complete the Trust's holding of fen habitat in the catchment, help protect its all-important water quality, and provide an excellent basis for habitat restoration. Critically, it would take the reserve up to the point at which surface water drains towards Cors Erddreiniog, rather than back to Cors Goch.

In order to take this opportunity, however, there is first the matter of a purchase price, then the need to provide vehicle access from the road. In short, the Trust needs to raise £260,000 by July, and so has launched the 'Fens Re-united' appeal. Generous support is already available from CCW and the Trust can add money from its own funds, but more is needed if this chance is not to be lost. Please consider a contribution; your help may make all the difference to an acquisition that, by common consent, is an urgent opportunity definitely not to be missed.

Please make cheques payable to North Wales Wildlife Trust (Appeal) and send, with your name and address, to NWWT, 376 High Street, Bangor, Gwynedd LL57 1YE.

GEOFF RADFORD is Chair of North Wales Wildlife Trust.



higher last year. In June we caught 50 dormice, half of which had been chipped the previous year. We also found several litters of young, from 'pinkies' to fully furred youngsters. On our visit in October, 129 animals were caught. In all, 171 animals were chipped last year, more than double the previous year's total. We now know exactly how well the population is doing, but much more about the factors which influence it.

To prepare for the emergence of dormice from hibernation, a group of volunteers and staff spent a beautiful March day replacing, emptying and putting up new dormice boxes in Swan Wood, ready for them to use in April. The sun shone and everybody had a good day – thanks for all the hard work! We expect to begin to see dormouse activity in May when we start to check the boxes.

If you'd like to work for otters and other wildlife why not call us and join our team of conservation volunteers! Contact Resi Tomat on 01248 351541.

***FRANCES CATTANACH* is Director of North Wales Wildlife Trust.**

Hysbysfwrdd / Noticeboard

If you would like your wildlife event to feature on these pages please contact Mandy Marsh on 01248 385574 or email m.marsh@ccw.gov.uk (entries may be edited). Please mention Natur Cymru if you attend any of these events.

RSPB

RAMSEY ISLAND GUIDED WALKS

Pembrokeshire - guided walks up to September, led by an RSPB Warden. Boats depart 9.30am. Appropriate footwear and reasonable level of fitness is required. Further information and booking please contact boat operator Thousand Islands Expeditions, **01437 721721** or **01437 721686**

North Wales Wildlife Trust

LACEY LECTURE

23 Nov *Finding the Words: speaking up for Nature*. Speaker Dr. Paul Evans (writer, Guardian Country diarist and broadcaster). Elwy Theatr, Ysgol Glan Clwyd, St. Asaph. Further details from NWWT Office **01248 351541**.

North East Wales Wildlife

EVENTS

7 Jul *Brookhill Wildlife Walk* 10am. Come and join us on a wildlife discovery trail around Brookhill Ponds.
14 Jul *Rhydymwyn Summer Wildflower Walk* 10am. Learn about the different summer wildflowers that can be found at Rhydymwyn Valley Nature Reserve. Details: Jacinta Williams **weo@newwildlife.org.uk** **01352 742 115**

University of Wales Aberystwyth

COURSES

Higher Education in the Community

3-6 Jul *The Geological History of Wales*. From the Caledonian Orogeny to the Quaternary Ice Age and the final shaping of the Welsh Landscape. UWA short course in St Davids, Pembrokeshire. Course Fee £40.
10-13 Jul *The Diversity of Invertebrates*. UWA course at the Welsh Wildlife Centre, Pembrokeshire. Course Fee £40.
For full details:
email **learning@aber.ac.uk or**
Tel: 01970 621580
www.aber.ac.uk/sell/courses/lllearn/science/

Fenn's, Whixall & Bettisfield Mosses NNR

29 Jul *Creatures of the Sculptures Plaques Walk* (3.5km), 1-4pm, Manor House NNR Base, to celebrate International Bog Day.
5 Aug *Meres and Mosses Month Festival Launch* 11.30-5pm, Cholmondley Castle. Family fun with Cheshire Wildlife Trust.
www.meresandmossesmonth.info or **01948 802 643** for details.
8 Aug *Bog Creatures Biodiversity Workshop for children*, 9.30-4.00, Manor House NNR Base £2.50 per child.
12 Aug *Family Bug Hunt* 2-4pm.
Contact: **01743 284 297**
www.meresandmossesmonth.info
26 Aug *Woodcarving Prehistoric Pines on the Mosses Day* 11-3.30, Manor House NNR Base, David Gerty of the British Woodcarvers, including a walk to fetch pine.
www.bwa-woodcarving.fsnet.co.uk
1 Sept *Meres and Mosses Month Grand Finale* 10-4pm, Wood Lane Quarry, near Ellesmere. Family fun with Cheshire Wildlife Trust.
www.meresandmossesmonth.info or **01743 284 297** for details.
23 Sept *Fungal Foray* Roy Mantle of The Shropshire Fungus Group. Meet 2pm at Morris's Bridge, Whixall Moss NNR car park www.britmycolsoc.org.uk

Some events MUST be booked IN ADVANCE – contact Caroline Evans **01743 282005**, or Joan Daniels on **07974 784799** (**caroline.evans@naturalengland.org.uk**, or **www.naturalengland.org.uk**)

Fenn's, and Whixall Mosses **practical volunteering tasks** are held on the **2nd Sunday and 4th Thursday of every month**. Contact **01948 880362** for details.

National Museum and Gallery

COAST

4-5 Aug *"Oh we do like to be beside the seaside!"* A free event linked to the BBC/OU programme Coast, hosted by the series' presenters and history and geography experts, and looking at a section on the South Wales coastline. Programme screenings, hands-on workshops and talks for visitors of all ages. Visit **www.open.ac.uk/events**, Tel: **029 2026 2774** for more information

Shared Earth Trust

COURSES

11 Jul *Pond Creation and Management* (in partnership with Flora Locale) £100/£50
18 Jul *Restoring Wildflower Meadows* (in partnership with Flora Locale) £100/£50
Contact **01570 493358**, **www.shared-earth-trust.org.uk**

Marcher Apple Network and Common Ground

THE BIG APPLE

www.marcherapple.net
www.commonground.org.uk
01747 850820
NB: many Autumn events are provisional. You should check details before travelling.
25-26 Aug *Black Mountains Festival*, Talgarth, Powys. MAN will be in the Cattle Market on the Sunday. Display of early apples & identification of ripe early varieties. Details from Sheila Leitch.
7-9 Sept *Ludlow Marches Food and Drink Festival*. Local cider makers and fruit juicers in attendance.
8 Sept *Kington Show*. Claire Edwards **01544 260602**
9 Sept *Entertainment under the Apples* near Rhayader, Powys. For full details tel **01597 811487**
15-16 Sept *Abergavenny Food Festival*. Julia French **01873 851643**
6-7 Oct *Apple Harvest*. Come and celebrate with cider tasting, apple press demonstrations, dancers, children's games and lots more for all the family. 11am-5pm Erddig (National Trust) nr Wrexham – normal admission rates apply. **01978 355314**, **Erddig@nationaltrust.org.uk** or see www.nationaltrust.org.uk

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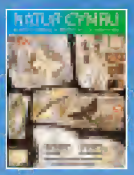

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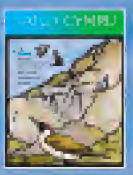

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